

The Mining Journal

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Another Skeleton in the Chancellor's Cupboard ?

THIS journal has repeatedly drawn attention to the folly of compelling British companies, as a result of crippling taxation, to relinquish control of mineral deposits which are essential to the Commonwealth's future development.

A few months ago a political storm was sparked off by the Trinidad Oil deal, which caused considerable heart-burning in many quarters. With this controversial transaction still a recent memory, we have been given yet another warning, this time by the attempts of the Tsumeb Corporation to take over the South West Africa Company, which is the largest producer of vanadium outside the Western Hemisphere.

Vanadium's principal commercial use is in the production of steel alloys, to which it imparts toughness, hardness and resistance to heat. Vanadium compounds are employed in the chemical industry for a number of purposes. Because of its high melting point (1,725 deg. C.) the metal is now being used to an increasing extent in the construction of jet aircraft for high-speed flight and for the same reason it appears to have a promising future in the nuclear field.

Although limited quantities of vanadium are available from other sources, the effect of the proposed deal would be to render the Commonwealth and Europe critically dependent on the United States for a material which, though not at present indispensable to the steel industry, might well become so as demands for high temperature materials increase. On behalf of the Tsumeb Corporation it has been stated that the takeover would make no difference whatever to the availability of the vanadium won in South West Africa for sale in the U.K. against payment in sterling, as hitherto. In these circumstances objections to the takeover might seem to lose much of their cogency. Once control of the deposits had passed out of Commonwealth hands, however, there could be no assurance that in the long-term future, with a new board in control of the South West Africa Company, this undertaking might not be disregarded.

Only by retaining control of its mineral resources to the fullest possible extent can the Commonwealth remain master of its own economic future. Welcome evidence that this essential truth is becoming more widely realized was afforded by the decision of the Opposition to make an issue of the Tsumeb bid in the House of Commons. In the words of Mr. Harold Wilson, M.P., a former President of the Board of Trade, "Labour is concerned to maintain an independent Commonwealth source of vanadium, so that we shall not be dependent on dollar sources of supply."

While in full agreement with this view, which is identical with our own, we cannot accept that the remedy lies in the veto, which is a purely negative solution and has the further defect of inviting retaliatory action from other countries where British interests are concerned. For example, Borax and the Bowater Paper Corporation both own very large undertakings in the United States.

The only effective approach to the problem, in our opinion, is to eliminate the conditions which make it impossible for British mining and oil companies to explore and develop their properties

economically on the scale required and so lead to takeover bids. In this connection it will be recalled that the Prime Minister, Mr. Harold Macmillan, when Chancellor of the Exchequer, promised to give careful consideration before the 1957 Finance Bill to the possibility of creating a new category of companies, to be known as "overseas trade corporations", which would be liable for U.K. taxation only in respect of distributed profits. Mr. Macmillan also promised the introduction of legislation to deal with the situation arising from the frustration by the U.K. tax system of "pioneer industry" relief which is granted by overseas authorities.

Although these benefits have yet to materialize, the Prime Minister's stated intentions seem already to have created a climate more favourable to the investment of risk capital in mining ventures, as indicated by the news that New Consolidated Gold Fields proposes—on behalf of it itself, Anglo American Corporation of South Africa, and the British South Africa Company—to make an offer to shareholders of South West Africa Company, which, if accepted, will achieve the desired objective more effectively than a government veto. The new offer is a timely reminder that, when not stifled by excessive taxation, the British overseas mining industry has never been lacking in vision or enterprise.

IS THE BLARNEY STONE A BASE METAL ?

Prospecting and exploration by present-day methods have shown that the little piece of heaven which fell from the skies so blue, besides being sprinkled with stardust to make the shamrock grow, has been liberally peppered with valuable deposits of non-ferrous metals. Each month brings news of further discoveries or confirmation of the rich potentialities of previous strikes. In recent years Irishmen have become increasingly conscious of the money-spinning qualities of their far-famed lakes and dells. Now they are realizing that some of the most valuable resources of the Emerald Isle are to be found not above the soil but beneath it.

The Eire Minister for Industry and Commerce announced this week that he had granted prospecting facilities in respect of two further mineralized areas in the Republic—at Caim, County Wexford, and at Hollyford, County Tipperary. There are known deposits of lead and zinc in the former locality, while copper occurrences have been noted at the latter.

The Wicklow Mining Co. Ltd.—an all-Irish firm—have already started prospecting work at Caim. This firm is also developing lead and zinc deposits at Glendalough, County Wicklow.

It is expected that initial prospecting work will soon be started at Hollyford by the Minerals Development Corporation Ltd., a subsidiary of New Spring Coulee Oil and Minerals Ltd., of Toronto. This firm is at present carrying on mineral survey work on various occurrences of copper, lead, zinc, and molybdenum in Counties Mayo and Galway.

According to the Minister, there are good prospects that prospecting will shortly be started in four other areas; near Skibbereen, County Cork (where there are copper deposits); near Clonakility, County Cork (where there is barytes); near Kenmare, County Kerry (copper deposits); and in East Clare (copper, lead and zinc deposits).

High-grade ores of antimony and gold have been found in a disused antimony mine at Clontibret, County Monaghan, states the Mining Corporation of Ireland, a subsidiary of Can-Erin Mining Co., of Toronto. Diamond drilling will start immediately to find out the extent of the

strike. About a month ago the company started operations in the disused antimony mine. After dewatering a 60 ft. shaft, it took samples every 10 ft. down. A general analysis showed one oz. of gold to the ton. It was expected that a good silver content would also be revealed. The antimony content went as high as 63 per cent. If this mine proves up to expectations a milling plant will be erected.

The Emerald Isle Mining Co.—another Can-Erin subsidiary—announced that delivery of additional dewatering machinery for work on the copper mines at Allihies, County Cork, is expected early next week. When in operation this machinery will make possible the rehabilitation of the 1,800-ft. shaft at the Mountain Mine, from which good ore samples have already been taken. Three drilling rigs are at present operating at Allihies—two underground and the third from the surface.

It is understood, however, that difficulties are being encountered in the dewatering process, which seems likely to fall considerably behind planned schedule. Pumping units are at present working on most of the old mine shafts at Allihies, but additional units will be necessary if the dewatering operations are to be speeded up within the next six months.

COMMONWEALTH STEEL EXPANSION

Even more remarkable than the expansion of world production of steel within the past twenty years is the fact that this phenomenal growth has been insufficient to satisfy world requirements. It is not merely in this country that important industries are so severely handicapped by short deliveries of steel as they are by the shortage of labour! All the world over the cry is for more and still more steel, and an ever growing number of nations, great and small, are straining their resources, financial and physical, to ensure a further progressive expansion of productive capacity.

Final figures for 1956 are not yet complete, but preliminary estimates suggest that alone amongst the big steel producing nations, the United States, which normally provides nearly 40 per cent of the total world production of ingots has failed to equal the 1955 record. Nevertheless, despite the loss of 10,000,000 tons of steel during the July strike American steel output in 1956 has probably exceeded 100,000,000 tons and almost equals the total of 104,500,000 tons turned out in 1955. Since the settlement activity has been accelerated and such is the pressure of demand that imports of steel have been increased by 25 per cent.

The European Coal and Steel Community has achieved a 69 per cent increase in steel production between 1950 and 1955, and expects to reach an aggregate output of 66,500,000 tonnes in 1958 and 75,000,000 tonnes in 1961, mainly by the building of three new integrated steel plants in coastal sites at Dunkirk, at Savana, West of Genoa and on an unspecified site in the North German coast.

The steps taken by the Indian government to increase steel production—described in detail in previous issues of *The Mining Journal*—are vindicated by the continued heavy imports from European sources—on both sides of the Iron Curtain—and also from the U.S. Here, however, the physical limitations upon rapid expansion are now more clearly recognized and the Minister for Industries has revealed that he has advised his government "not to increase the target of 4,500,000 tons of finished steel at the end of the Second Five-Year Plan" which he describes as "an outside practicable possibility".

What of the British Dominions? They too are boldly

planning to achieve a greater measure of self sufficiency. The South African Iron and Steel Industrial Corporation—popularly known as ISCOR—boasts that it will soon be able to supply the Union with 100 per cent of its steel requirements, but others are more restrained in their expectations of an early elimination of the wide gap between South Africa's steel production and demand. Nevertheless, it is a fact that ISCOR has approved a scheme of extensions which at a capital cost of £33,000,000 is designed to increase within the next four years the company's ingot production by 550,000 tons to 2,000,000 tons per annum.

Nor are the four-year extension plans at Pretoria and Venderbijl Park the limit of ISCOR's aspirations. The search for a site for a third steel works has already begun.

In Australia a memorable event is the completion of the new open-hearth steel plant at Port Kembla, New South Wales, at a capital cost of £A5,500,000. This, it is expected, will provide an additional annual yield of 350,000 tons of ingots.

Finally Canada, with a steadily expanding output of iron and steel, is not only increasing at a spectacular rate iron ore deliveries from existing ore fields but also announces the formation of a big international combine for the mining and marketing of huge deposits of iron in the beach sands of Eastern Quebec.

It is stated that the company has decided to build a \$10,000,000 separating and concentrating unit at Nateshan, on the northern bank of the St. Lawrence, to produce 1,000,000 tons of concentrate a year. This may be only a small contribution to the world's supplies, but in view of the intensive search for accessible ores it is by no means unimportant. Further details appear on page 184.

In this country steel production in 1956 amounted to 20,700,000 tons, approximately 900,000 tons better than in 1955 and pig iron production reached 13,170,000 tons, an increase of 5.5 per cent over 1955 when 12,470,000 were manufactured. As to future prospects the British Iron and Steel Federation takes a cautious view but, subject to the reservation that no reliable estimate is possible, the Federation states that the industry's ingot capacity is expected to reach 22,250,000 tons this year.

An increase of this order should suffice to overtake the home demand—with the possible exception of plates and heavy structural—but as a precautionary measure against the steel makers' possible surrender to the temptations of the high premiums offered by overseas buyers, the Board of Trade has tightened up the export controls. Hitherto, only plates and sheet steel exports have had to be licensed: now the scope of the licensing system is extended to embrace all types of pig iron, steel rails and alloy and non-alloy steel sections, bars and rods.

Chancellor Discusses Development of Commonwealth Resources

Speaking at the 75th Anniversary Dinner of the London Metal Exchange in London last Tuesday, Mr. Peter Thorneycroft, Chancellor of the Exchequer, made some interesting observations on his view of the function of government *vis-à-vis* industry.

"The rôle of government," he said, "is different from the rôle of industry. I think some of our dangers are when we try to mix the two up together. The rôle of industry is to do the job and get on with the skill in market operations or manufacture. The rôle of government is to try to create conditions in which markets are able to operate and manufacturers are able to adventure, to create opportunities and to contain inflation and achieve balances."

"We may be looking forward to some quite big opportunities in future—the opportunity of a larger trading area in Europe. Undoubtedly there is great opportunity in wider markets, not only for those who actually manufacture goods, but for those who provide all the multifarious services of insurances, banking, finance and commodity markets such as yours."

"We must in future play a big part in the British Commonwealth and in this country in development and trade of metals. Vast riches are found within the British Commonwealth. Great demands are growing all over the world and, in meeting all these demands, your exchange will continue in future, as in the past, to play a notable part."

"Our progress since 1952," he continued, "has resulted in greater output and production and advances in investment and living standards. The volume of international business in London commodity markets was £400 million in 1955 compared with £300 million in 1954. Behind that growth there has in the case of metals, been something of an industrial revolution."

Mr. Philip G. Smith, Chairman of the Committee of the Exchange in replying to Mr. Thorneycroft observed that the method of dealing on the Metal Exchange today was little changed from the early days of the Ex-

change. The form of the contract was still the same fundamentally, although the passing of the years had seen alterations to keep pace with the development of metallurgical processes.

During the years the Exchange had become the major futures' market in the world for copper, tin, lead and zinc, and its daily quotations had achieved a world-wide significance. The reasons why these quotations were accepted now was the same as 75 years ago, namely that they were established by means of open bidding and offering by dealers sitting in a ring, and also that the organization of the Exchange was so flexible that no order, however big, need remain unexecuted through lack of buyers or sellers, even though dealings were concentrated into a very small space of time each day.

Throughout the years the L.M.E. prices had been of the greatest use to commerce in indicating the general trend of values and to-day they still performed this function, not only for commerce but also for those who published so-called "fixed" prices.

Continuing Mr. Smith said "Our main difficulty is the American stockpiling. I make no apologies for talking about this, but it is one of the major factors in world metal trading to-day. The American stockpile started off to pile up stocks against the possibility of a war in which America would be cut off from her source of supply. That we could all understand and appreciate. But now this stockpiling is becoming a price war policy, and in lead and zinc it is openly so called, and it has the effect of draining from London the excess production of metals which should come here, not only to form a more secure basis for our market but also to supply metal to be financed and warehoused by the Institutions in the City of London."

"Until we do get more of the surplus production of metal in this country the London Metal Exchange, although functioning satisfactorily, will not regain its pre-eminent position it occupied before the war. I'm sorry to have to say that but it is a fact and we have to face up to it."

IN June, 1952, the N.C.B. approved in principle the setting up of a station to carry out the duties referred to in the introductory note, to be known as the Central Engineering Establishment. Control of the establishment would be in the hands of a Director—an engineer—who would be responsible to the Chief Engineer at Headquarters. This control arrangement was later endorsed by the Fleck Committee.

The search then began for a suitable site within easy reach of the coalfields and a site at Bretby in South Derbyshire on Coal Board property was the final choice.

The establishment, now completed, has as its objectives:

- (a) Development of existing equipment and to design and produce prototypes of new equipment and components;
- (b) Preparation of technical specifications and designs of new machines enabling alternative sources of manufacture to be exploited;
- (c) Encouragement of British manufacturers of mining machinery to speed up development and the introduction of new techniques;
- (d) Proving of equipment developed under the development programme, and equipment from outside sources;
- (e) Evolving of standards and methods of acceptance and testing to be used by the Board;
- (f) Carrying out of acceptance trials of equipment in the pre-production and production stages.

The work of the Establishment is organized into six departments, which are concerned respectively with development engineering; projects; proving and acceptance of machines, materials and equipment; general engineering and maintenance services; special projects (i.e. developments in specialized or non-traditional fields); administration and finance.

The main purpose of the establishment is to accelerate development and testing in the engineering field and to give the greatest possible assistance to the mining engineers in solving their many problems in winning coal in

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Research

Centre for U.K.

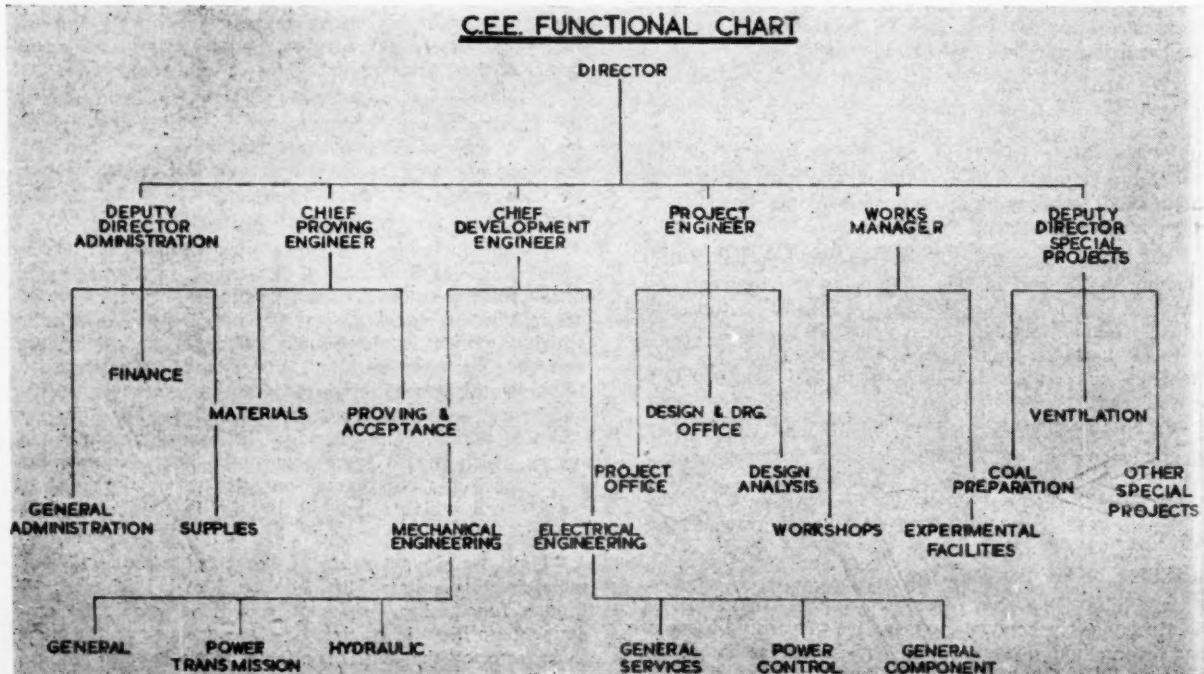
Coal Mining

greater quantities and in larger sizes and more economically.

It is not intended to manufacture specialized machines in quantities but merely to take them to the prototype stage, to try them out and thus to stimulate the introduction of new machines. In many cases the resources of the Establishment are inadequate to build complete machines and a substantial amount of development work will be undertaken by outside industry in co-operation with and under the general direction of specialist engineers.

Another function of the Establishment will be to pick up—through the Awards Invention Scheme; by direct contact with people in the field; by contact with the various specialist technical services such as mechanization, strata control, mechanical engineering, electrical engineering, safety, and so on—any ideas considered worthy of development.

The closest possible contact is maintained with the Board's two research establishments from whom C.E.E. will receive ideas already brought to a stage ready for



Some time after nationalization it became apparent that there was a pressing need for the National Coal Board to have a testing and development station solely for its own use. In the past the mining industry had relied almost entirely on manufacturers for the development of new kinds of mining machinery. But the manufacturers to-day have a heavy load of normal production, and are naturally influenced by commercial considerations which make them hesitant to commit scarce resources to the development of new machines until assured of a firm market. Whilst not under-rating the contribution they had made it was therefore clear that something more was necessary. There was also an obvious need for a centre where the testing of new equipment and new materials could be carried out, and for the establishment by careful trial and experiment of standard testing procedures and approved specifications of performance under test. Facilities were also needed for testing equipment which had failed in service.

further development. There is two-way traffic and C.E.E. passes problems back to the research establishments on which more fundamental research work is required.

The total cost of the Establishment will be just under £1,000,000.

Among the many projects at present in hand mention might be made of the investigation into the possibilities of using reinforced plastics in place of some of the hazardous alloys which were recently expelled from British pits.

The most promising materials have been found to be of the glass fibre reinforced polyester resin group and some experimental flameproof enclosures have been obtained. These will, in due course, be submitted to S.M.R.E. Buxton for experimental tests of their physical strength and flameproofing properties. They were pressed from wooden moulds and required no further machining. It is possible to drill and tap the material, which has exceptionally high tensile strength and good fatigue and impact resistance.

Another interesting piece of work being done in the electrical development laboratory is the development of a system for achieving selective calling on party lines underground.

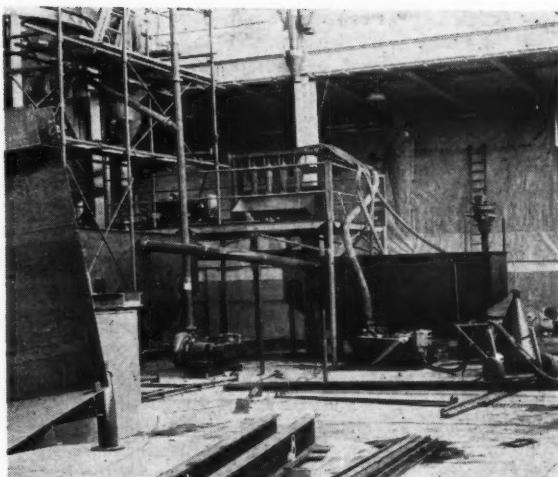
Any piece of electrical equipment for use underground has to be certified either as being intrinsically safe or as a flameproof enclosure. It has been the practice in the past to aim for intrinsic safety on light current equipment, and the same procedure has been adopted in this circuit.

It is almost impossible to achieve an intrinsically safe selective calling circuit without recourse to electronics and in this connection the coal mining industry is at a disadvantage, since thermionic valves are not at the moment allowed underground unless they are sealed in a flameproof enclosure. Therefore, a direct contradiction exists between the aim and its achievement using existing equipment. The advent of the transistor has made further development possible since it has every possibility of being declared safe for underground use provided that due attention is paid to the circuitry.

In the system which is being developed here, a Wein Bridge oscillator using transistors instead of valves is used as the calling agent. It is capable of being switched to any one of the eight frequencies, has no warming up period and can be operated from a 12 v. mining type signalling battery. Thus up to eight stations may be connected to one pair of lines.

An interesting project in the mechanical engineering section is that dealing with the use of undrawn nylon ropes as overwind arresters.

In the event of an overwind with a friction winder an arresting device is required which will bring the winding



The installation of slurry settling tanks

system safely to rest and minimize the risk of impact between the cages or skips and the bumping beams in the headframe. On many Continental friction winders some form of tapered wooden guide is installed, both at pit top and pit bottom, and in the event of an overwind, constricting shoes attached to the conveyances engage with these wooden guides and so bring the system to rest. Since these wooden guides arresters rely on coefficients of friction and the crushing of timber they give a rather unpredictable performance.

Successful prediction of an arrester's performance is essential to prevent excessive damage to the installation and injury to any persons being wound. Investigations carried out at C.E.E. to discover an efficient method of overwind arresting led to the consideration of synthetic fibres in the form of undrawn nylon ropes.

Undrawn nylon, in the form of stranded ropes, has a remarkably high energy absorption capacity under dynamic tensile loading and an energy of 50,000 ft.-lb. can be absorbed by 1 lb. of undrawn nylon rope at failure.

To prove the use of undrawn nylon ropes for this duty of overwind production a programme of full-scale tests is planned at the Swadlincote test ground and it is expected that these tests will show that this system will give a performance which can be predicted fairly accurately.

A Dosco cross conveyor on test



THE Big Buck orebody is developed by an adit haulage level driven below the orebody, a system of near-vertical ore passes connecting the haulage level with the stopes above, and an incline for passage of personnel, equipment, and supplies from the haulage level to the stopes. Mine development and the mining techniques employed represent a system of co-ordinated mining phases that typify the advance planning that has gone into production of uranium ore from the larger and thicker deposits on the Colorado Plateau. Based on the total tonnage of the orebody and its manner of occurrence, a planned rate of production of 500 tons per day from a two-shift operation, was decided upon. The methods of development and system of mining were then planned to attain this rate of production.

Topographic features in the area of the Big Buck claim group would have permitted access to the orebody either by sinking a 400-ft. shaft about 500 ft. east of the orebody or by driving approximately 2,000 ft. of adit. Driving the adit for access to the orebody was chosen on the basis of ultimate cost saving, flexibility in operation, and pillar extraction.

Since a room-and-pillar method of mining the relatively horizontal orebody was decided upon, development planning had to consider a systematic method of pillar extraction. Gravity ore passes and a haulage level below the ore horizon provide existing workings from which to work safely when recovering pillars. Caving within the stoping area will not damage these lower workings. Choice of a main haulage level below the ore permits use of track-type haulage equipment, thereby eliminating a haulage system adapted to steeper grades and local irregularities of the stope bottom. It also permits underground ore storage as well as gravity-feed mine-car loading from chute installations. To minimize the number of draw points and installation costs, and also to take advantage of existing topographic conditions at the surface for mine plant construction, the haulage level was established about 100 ft. below the ore. This difference in elevation permits adequate underground storage capacity, allowing a continuous main haulage cycle, with the fewest number of ore passes.

The portal of the adit is at an elevation of 6,482 ft. above sea level. The adit was driven on a bearing of N. 77 deg. E. for 2,000 ft., where it junctions with two diverging haulage drifts that were driven in opposite directions and roughly parallel the long dimension of the orebody. The haulage level ranges from about 71 to 114 ft. below the undulating stope bottom. Three untimbered ore passes connect the two levels, though when fully developed two additional ore passes will be driven from the south-east haulage drift. Total storage capacity of the three passes is about 390 tons.

At a distance of 1,625 ft. from the portal, an 8- by 8-ft. incline was driven from the adit upward to the ore horizon. The incline is 430 ft. long to the point where ore was first contacted. The grade of the incline changes over its length but averages 19 per cent. The larger cross-sectional size of the first 1,625 ft. of the haulage level and that of the incline permits moving large, trackless-type, mining equipment between the surface and the stopes.

A regularly spaced room-and-pillar system of mining is employed at the Big Buck mine. Mining to date by Stand-

The Big Buck mine is one of the larger underground uranium-vanadium ore mines on the Colorado Plateau. The Standard Uranium Corporation employs a regularly spaced room and pillar system at the Big Buck, the characteristics of the orebody being suited to mechanized trackless mining. The operation of the Big Buck mine is described in the U.S. Bureau of Mines' Information Circular 7766.

ard Uranium Corporation has been confined to an area approximately 560 ft. long and 260 ft. wide. Utex Exploration Co. produced ore under contract from the Big Buck 8-A and 9 claims while driving south-east to make the ventilation connection between the Big Buck and Mi Vida mines.

The main rooms or haulageways are 20 ft. wide on 40-ft. centres, laid out in a north-west - south-east direction and roughly paralleling the longitudinal axis of the orebody. The transverse rooms or haulageways are also 20 ft. wide but are on 70-ft. centres. The pillars average 20 by 50 ft.. The rooms are mined to the full height of the ore in 1 or 2 advances. Where the ore is 10 to 15 ft. high, it is mined to its full height on the first advance. In thicker ore 10- to 12-ft. rooms are first advanced along the top of

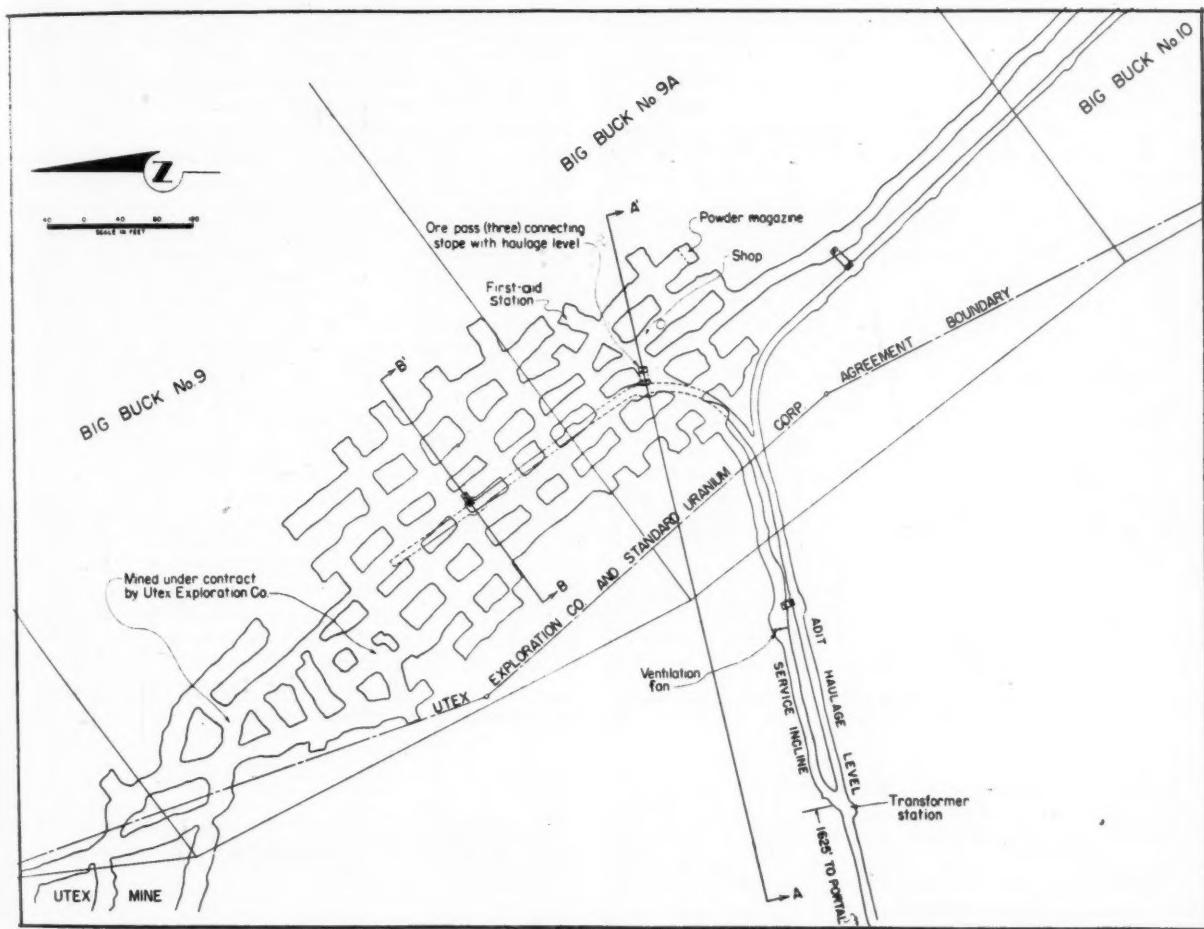
Mining Uranium at the Big Buck Mine, Utah

the ore with the second advance following the bottom. Because of local irregularities at the base of the ore, the bottom is drilled with a jackhammer and the drill cuttings checked to ascertain that the full section of the ore has been mined. Until the limits of the orebody are reached, the entire mine production will come from mining on the advance.

Room-and-pillar mining is adaptable to the thickness, size, and continuity of the Big Buck ore body. Experience at the neighbouring Mi Vida mine demonstrated that 20-ft. spans of unsupported back are safe. The 20-ft. rooms were also considered as near optimum size for the efficient operating capabilities of the type of drilling and loading equipment used. Certain areas are roof bolted.

The thickness, size, and gentle dip of the deposit are suited to mechanized trackless mining. The operational phases of mining are matched to the capabilities of a model 46 Gismo loader and a similarly designed drill jumbo. The Gismo loader unit is powered by an Eimco, model 105, crawler tractor, which together operates as a loader and transport.

The drill jumbo consists of four percussion rock drills mounted on 12-ft. shells, each positioned independently on hydraulically-operated extensible booms. The V-shape frame construction near the coupling pin permits the tractor operator to turn the drill jumbo at near right angles to the tractor, which assists its positioning within a limited space. The drill jumbo is usually positioned about 10 ft. from the face to be drilled. The jumbo is axle-mounted on dual 15 in. wheels and 7.50 in. by 15 in., 10-ply tyres. The extensible booms, actuating cylinders, and hydraulic system are standard equipment of the Joy Manufacturing Co. model DJA drill jib assembly. The extensible booms are 9 ft. long but can be extended to 12 ft. manually. Two 3½ in. rock drills are mounted on the bottom booms, and two 3 in. drills are mounted on the top booms. The shells have drill-steel stabilizers to lessen drill-steel vibration. 12 ft., 1½ in. round drill steel with 1¼ in. dia. detachable tungsten carbide bits are used. The 12 ft. shells and drill steel permit drilling the 10 ft. blast holes without steel



Plan of the underground workings of the Big Buck mine, Utah

changes. Principal steel breakage occurs at the lugged ends but with the extra length of the steel, two or three additional shanks can be reforged. Bit life approximates 1,500 ft.

Two men operate the four drills by a system of remote-control valves mounted together on each side of the drill jumbo frame. When a round has been drilled, the jumbo is moved by the Eimco tractor and positioned at the next face to be drilled. The tractor is then free to be re-coupled to the Gismo for mucking service.

Drill holes, except for the cut and reliever holes, are spaced roughly on 2-ft. centres. A drill round in 9- to 11-ft. ore usually consists of 88 holes, the number increasing as the height of the ore increases. A five-hole burn cut surrounded by eight reliever holes drilled on about a 2-ft. dia. circle is used. All holes, except the centre cut hole and the bottom or secondary row of lifter holes, are drilled 10 ft. deep. The centre cut hole is drilled about 2 ft. deeper. The secondary row of lifter holes consists of shorter holes drilled 4½ ft. deep to break the hump left near the collars by the main lifter holes.

When advancing in 12-ft. ores, it takes slightly less than four hours to move the drill jumbo into position, complete the set-up, and drill the 99-hole round. Average rate of drilling, including set-up time, is about 115 ft. per man-hour for two drills.

In blasting, medium-velocity 40 per cent dynamite is used in cartridges 1½ by 24 in. Stemming is not used. The

centre hole of the burn cut, which is drilled about 2 ft. deeper, is loaded with only one or two 8-in. sticks of dynamite, which are detonated immediately after the other four cut holes to clear the cut. Millisecond-delay blasting, which produces better fragmentation, is used.

The main service blasting lines are 8-gauge insulated copper wires upon which is imposed a 440 v. alternating current to detonate a round. These main lines are securely mounted on insulators placed along the back of the workings away from other power-lines and maintained to within about 100 ft. of the working faces. The blasting station is in the adit at its intersection with the incline. Blasting is done only at the end of the night shift, about 12:45 a.m.

The Gismo loader unit is very simple in function, design, and construction. A single pin couples the front end of the Eimco diesel tractor to the rear end of the loader. Together, these become a rugged self-contained machine for loading, transporting, and dumping ore. The entire unit is operated by one man who does not have to leave the cab of the tractor. Minimum operating height required is 7.5 ft. The hopper and dipper are designed to hold about six tons.

During the final quarter of 1955, production from the Big Buck mine averaged 9,369.99 tons of ore per month. Of this average, Standard Uranium Corporation produced an average of 7,393.67 tons per month. During January and February, 1956, Standard Uranium Corporation increased production to 7,848.82 and 10,503.73 tons.

ESTIMATES based on the latest figures available at the end of the year indicate that shipments of iron ore from Canadian mines rose during 1956 to more than 20,000,000 tons from 16,700,000 tons in the previous year. Iron ore ranked tenth in Canadian exports in 1956, coming after nickel, aluminium and copper in the metal group. It is probable that Canada is now the fourth largest producer of iron ore, ranking after the U.S., the U.S.S.R. and France, in that order.

Throughout the Dominion there are numerous iron prospects to which attention is currently being given by both Canadian and U.S. ore and steel producing companies. It seems certain that new production records will once again be set up during 1957 and the possibility that by the early 60's annual production will be in the region of 50,000,000 tons can by no means be excluded.

The search for iron ore is being continued at an accelerating pace, a primary objective being the discovery of low-grade deposits that can be concentrated for shipment to the U.S. and abroad. Development is also proceeding very rapidly in a number of areas and large sums are being spent in bringing new properties to production.

Iron Ore

Hitherto, the Dominion's premier producer has been the Iron Ore Co., of Canada, which accounted for some 12,000,000 tons of last year's total. Its next production target is 20,000,000 tons, but an annual output of 30,000,000 is regarded as quite possible after the St. Lawrence Seaway comes into operation.

The second largest producer is Steep Rock Mines, which had an output of 3,250,000 tons in 1956. Caland Ore Co., a wholly-owned subsidiary of the U.S. steel producers, Inland Steel, is at present engaged in the gigantic task of preparing the leased C zone of Steep Rock Iron Mines for production on a royalty basis. This project, which is one of the largest new mine undertakings in Canada, will cost some \$50,000,000. From an initial rate of 1,500,000 tons a year, output will ultimately be expanded to 3,000,000 tons.

Dominion Wabana and Algoma, with outputs of 2,500,000 tons and 1,500,000 tons respectively were the Dominion's third and fourth largest producers in 1956.

Next, in order of magnitude, came the Bethlehem Steel Co.'s mine at Marmora, Ont., which has settled into the steady routine of normal operations at the rate of 500,000 tons a year. The ore averages about 37 per cent iron and is beneficiated by magnetic concentration.

Immense occurrences of iron-bearing material have been located in Eastern Canada, where a broad belt of ferri-ferous formation extends almost continuously from the north-eastern tip of Ungava Bay to the Mistassini area of Quebec. At the northern extremity of this belt the Cyrus Eaton Interests (International Iron Ore Co. and Atlantic Iron Ores) are launching an ambitious project for the production of pellets from large deposits of low-grade material at a cost of about \$50,000,000. Further southward work is continuing on the extensive holdings of Rio Tinto's Oceanic Iron Ore of Canada and Cons. Fenimore Iron Mines.

The completion of agreements between companies of four nations to mine and market iron and other ores from

a large deposit of beach sands in Eastern Quebec has been announced by Aconic Mining Corporation, which holds a mining licence for the deposit. The other companies involved are the Klockner-Humboldt-Deutz combine of Duisburg, West Germany; Ferguson Wild and Co., of London; and Frank Samuels and Co., of the U.S.

The principal agreement is with Klockner, who are to build a \$10,000,000 separation and concentrating unit at Natashquan, near the mouth of the St. Lawrence River, to produce at least 1,000,000 tons of iron ore concentrates annually. This unit is to be completed by 1959. Klockner have agreed to buy 750,000 tons of the yearly output at \$7.47½ per ton f.o.b. Natashquan. Of this amount, 267,000 tons annually for five years will go to the German company as repayment of 80 per cent of the cost of the concentrating unit, while the remainder of the shipments will be paid for in cash. The balance of the total yearly output has been contracted for by two other companies at the same price.

The iron ore is said to comprise 65-70 per cent ferrous magnetite with a maximum of 3.3 per cent titanium oxide. Reserves in the beach sand deposit are estimated at between 15,000,000 and 18,000,000 tons, each 25 tons yielding 1 ton of iron ore concentrate, plus a huge quantity of by-products—ilmenite, garnet and zircon. It is thought that this may be the cheapest iron ore mining proposition in the world, due mainly to the elimination of ore-crushing and the ease of transportation.

It was recently reported (*The Mining Journal*, 11/1/57, pp. 54 and 55) that Cartier Mining Co. Ltd., a subsidiary

In Canada

of the U.S. Steel Corporation, was planning to form a new company to investigate and develop a large iron ore mining site north of Shelter Bay, Quebec.

Another area which is attracting considerable attention is the Wabush Lake sector of the "Labrador Trough", where there are vast deposits of low-grade material suitable for beneficiation. Very important deposits are held by Canadian Javelin, which hopes to have its first 2,000-ton concentrating unit in operation by the end of this year. A total of ten such units is proposed by the company, which already holds contracts covering the sale of 6,000,000 tons of pellets annually.

Also under active investigation are low-grade iron deposits on the Belcher Islands, Hudson Bay, where the Belcher Mining Corporation has been carrying out an extensive drilling programme.

Prices of Canadian iron ores are usually based on the market price received by the Lake Superior district producers of the U.S. The year 1956 saw standard 51.5 per cent Mesabi ore commanding \$10.95 to \$11.25 per ton delivered to lower lake ports. This represented an 8 per cent increase over the previous year, the sharpest gain for any year since 1948. In the early war years the same ore was selling in the \$4.70 - \$4.95 range.

In view of the enormous capital expenditure being made on beneficiation plants, coupled with the fact that two or three tons of low grade will have to be mined to produce a single ton of ore. *The Northern Miner* sees little prospect of ore prices declining. In fact, they may well be raised.

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Technical Briefs

Peat as a Taconite Binder

A research team at the University of Minnesota, United States, has found that ground-up peat reinforced with an alkali solution both lowers the cost and serves as an excellent binder for the balling or pelletizing of powdered taconite concentrate.

As it is mined, taconite contains only about 25 per cent iron. Since this iron content is too low for direct feed of the rock to the blast furnaces, the ore must be concentrated. This is accomplished by grinding taconite into tiny particles and then separating the magnetic iron from the mother rock in magnetic separators.

The resulting purified ore contains about 62 per cent iron but is much too fine for the blast furnace. To obtain a suitable loose packing which will allow the furnace blast to pass through the ore during the smelting operation, it is necessary to form the powdered ore into $\frac{1}{2}$ to $\frac{1}{4}$ in. balls or pellets in a balling drum. The pellets then are baked or sintered in a furnace to strengthen them so they will withstand handling, shipping and feeding into the blast furnace. The function of a binder is to give the pellets sufficient strength to withstand handling between the balling drum and the sintering furnace and to hold their form while being baked.

Binders currently being used in taconite processing include bentonite and gelatinized starch. Approximately 10 lb. of bentonite or 4 lb. of starch are used per ton of taconite concentrate. The Minnesota chemical engineers have found that they can do as good a binding job using about $\frac{1}{2}$ lb. of peat and alkali per ton of taconite concentrate. Cost of the bentonite ranges from 13 to 15 c. while the starch cost runs between 16 and 24 c. per ton of taconite concentrate processed. Preliminary estimates indicate that the cost of the peat and alkali binder probably will be below that of bentonite.

Peat's qualities as a taconite binder are based on laboratory studies alone and much additional laboratory and pilot plant work remains to be done before its use in the commercial processing of taconite will be undertaken.

NEW POWDER METALLURGY PROCESS

A new process for making wrought products from metal powders has been developed by the Sintercast Corporation of America. By this method, the known advantages of powder metallurgy—the ability to "tailor" compositions of metallic mixtures to specific requirements—can be applied to the manufacture of shapes such as strips, bars and tubes of long lengths hitherto unobtainable by powder metallurgy.

Known as Sinterwrought, this new process is said to eliminate many of the disadvantages of conventional powder metallurgy techniques and of conventional casting and metalworking.

Sinterwrought products are claimed to have greater strength and ductility than



Two portions of glazed tile, bonded glaze to glaze with Corro-Proof "PXY" Cement. It is claimed that attempted separation of tiles merely leads to their disintegration

most conventional metal powder products. Equally important, they do not contain the impurities present in the cast billets from which conventional wrought materials are made.

Metals handled by the new method include aluminium, copper, nickel, cobalt, carbon steel, stainless steel, and alloys of these metals. Recent experiments indicate that metals of increasing industrial significance, such as columbium, titanium and zirconium, may also be handled by the Sinterwrought technique.

EPOXY RESIN CEMENTS

The group of petroleum derived epoxy resins have been used with considerable success for industrial and commercial applications for several years. New uses appear to be continuously discovered for these materials and their incorporation in a chemical-resistant cement for bonding acid-resisting tiles and as a heavy gauge cold setting membrane is a new and interesting development. Two products recently available, Corro-Proof "PXY" Cement and Corro-Proof "PXY" Resin Membrane incorporate epoxy resins in their formulations which give them a number of remarkable properties.

Viewed solely from the point of view of chemical resistance, the epoxy resins do not offer the marked advantage over the more conventional furane, phenolic and cashew nut shell resins, which may in fact, in particular applications actually have a superior chemical resistance. It is in regard to mechanical strength that epoxy resin cement does show very considerable advantages over other types of resinous cement.

One of the principal factors causing failures in heavy-duty chemical-resistant

linings is the failure of the bonding cement mechanically, either through poor adhesion or the development of hair-cracks due to thermal shock, differences in co-efficients of expansion of the materials employed or vibration. A bonding medium that will adhere tenaciously to materials of low absorption or even to glazed surfaces, and that has an exceptionally high tensile and shear strength, is therefore an important addition to the range of chemical resistant materials of construction, particularly in the linings of plant or the protection of structures operating under severe chemical and mechanical conditions where any breakdown will necessitate a costly interruption to production.

It is claimed by Corrosion Proof Products Ltd. that the mechanical properties of these materials should make them of particular interest to corrosion engineers and all those whose business it is to design and install plant which must both be chemically resistant and mechanically strong enough to withstand vibration and thermal shock. For example, in the lining of pickling tanks in steel works these epoxy resin based cements should prove invaluable.

A NEW GREASE FAMILY

The Molytone family of greases is now being launched by Rocol, Ltd., in the U.K., Europe, the Commonwealth and Latin America. The grease range consists of Molytone grease, Molytone L.M., Molytone X., and Molytone C. This new family of greases has an extremely wide field of industrial application. They solve many lubrication problems wherever two surfaces are in relative movement. The family is based on special Bentone greases containing molybdenum disulphide.

MINING MISCELLANY

It has been reported that a team of geologists from the U.K. Atomic Energy Commission will visit the Gold Coast this year to examine possible deposits of uranium and thorium.

★

Granby Consolidated Mining Smelting and Power Company has announced its intention of closing the Copper Mountain Mine, West of Vancouver, at the end of March. The company is reported as saying that only a recovery of copper prices to the 45 cent level would cause the mine to be kept open. This does not look like a betting proposition.

★

The Mining Organization of Thailand was reported to be making satisfactory progress in its gold mining operations at Krabinburi. Gold concentrates in the locality are said to contain up to 95 per cent of the metal. The Prime Minister, after studying the report of the Department of Mines, promised to find Baht 1,500,000 capital for developing this mine on a commercial basis.

★

It is reported that uranium reserves conservatively estimated to be worth between £10,000,000 and £20,000,000 have been discovered at Buller Gorge on the West Coast in South Island, New Zealand. Some samples are said to have shown two to five per cent uranium oxide. The claims are held by Lime and Marble, Ltd., of Nelson, who are mineral prospectors. A few days ago it was announced that the Rio Tinto Co. had applied for prospecting licences at Buller Gorge.

★

The first deposit of bentonite in South Africa has been discovered on the farm Cairo in the district of Parys, O.F.S. The deposit covers an area of over 20 acres to a depth of 150 ft. Approximately 200 to 300 tons per month are at present being mined by a recently registered company, Bentonite South Africa Ltd. Formerly all bentonite used in the Union was imported either from Wyoming or from the Greek island of Pontia at a cost of about £100 per ton. Another mineral found near Parys is ganister, which is now being supplied to the South African steel industry.

★

Consolidated Denison Mines' contract for the sale of uranium precipitates to Eldorado Mining and Refining Ltd. has recently been enlarged by \$19,645,000, bringing the total value of precipitates to be delivered to \$201,895,000. The purpose of the increase, and of extension of the time for delivery, is to allow five full years for amortization of plant. The average grade of ore at present being mined and stockpiled is 3.4 lb. per ton. The directors expect that Consolidated Denison, with the largest single uranium plant in the world, its tremendous ore reserves, excellent grade and indicated low costs, will become one of the industry's leading producers.

★

The Consolidated Pneumatic Tool Co., Ltd., are using Jenolite Type "M", a micronized natural graphite in colloidal suspension, as a lubricant during the

assembly and running-in of their reciprocating compressors, reports *The Jenolite News*. The Jenolite process is used at the pre-assembly state for sheet metal work and also for compressor detail component parts for removal of rust, scale and moulding sand, serving also as an anti-corrosive. The value of Jenograph after running-in has also been appreciated, and the National Coal Board in the Alloa area is using the micronized graphite lubricant for the compressor already in commission.

★

Adastra Hunting Geophysics, Ltd., of Australia, has recently increased its airborne geophysical equipment by the addition of a Canso aircraft and a helicopter. The Canso is fitted up to carry a magnetometer, an electro-magnetic detector, and a scintillation counter for the detection of radioactive ores. The helicopter will carry the electro-magnetic detector. In Tasmania electro-magnetic surveys are currently being carried out using the helicopter and airborne magnetic surveys are in progress for mineral exploration. Other mineral surveys using the airborne magnetometer are proceeding in Queensland, South Australia, and New South Wales. In South Australia the airborne magnetometer is being used to assist in the search for oil.

★

Eureka Corporation (Ventures Ltd.) finds that its water troubles in rehabilitating the old Eureka district in Nevada are still with it. After drilling found the faulted segments of rich veins that had made the old camp famous in its early days, the company sank the Fad shaft but encountered such a flood that it was obliged to suspend efforts to control it after a very long and expensive attempt. While this was going on, drilling a mile north of the Fad revealed good ore at a level above the Fad water horizon and the T.L. shaft was sunk 1,050 ft. to develop it. Now T.L. has encountered water in plenty and at present is pumping 2,000 g.p.m. The flow is being controlled and equipment is being installed to handle up to 7,500 g.p.m. The grade and tonnage of the ore indicated in both shafts is such that the effort will be well worth while when the battle is won.

PERSONAL

The Right Hon. Sir Walter Monckton has been appointed a member of the boards of Midland Bank Ltd. and of Midland Bank Executor and Trustee Co., Ltd.

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Mr. C. J. Burns has been elected a director of Amalgamated Bantam Areas Ltd.

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Mr. C. W. Parish has resigned from the board of the United Tin Areas of Nigeria.

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The board of New Union Goldfields is now constituted as follows: Mr. M. E. Rich (British) (chairman), Mr. R. P. W. Adeane (British), Mr. H. C. Drayton

(British), Mr. I. Hayman, Mr. H. A. Mackay (joint general manager), Mr. S. L. Segal (joint general manager).

★

Dr. William Reid has been appointed chairman of the Durham Division of the National Coal Board in succession to Mr. E. H. D. Skinner. The Minister of Power has agreed, at Dr. Reid's request, to the termination of his appointment as a member of the National Board.

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Mr. A. Trebucq, having reached retirement age, has resigned his executive appointment as deputy chairman and joint managing director of H. J. Enthoven and Sons, but retains his seat on the board. Mr. P. R. R. Coad becomes sole managing director.

★

Mr. S. A. Mousley, general sales manager of Dunlop's general rubber goods division in Manchester, has been appointed general manager of the company's belting division with headquarters at Speke.

★

As from Monday, February 11, Barclays Bank D.C.O. are opening a General Manager's Office in Johannesburg. In charge will be Mr. H. Entwhistle, one of the Bank's general managers in South Africa. The new office will have particular reference to the Bank's business in the Johannesburg and Reef area. Barclays Bank D.C.O. now has 618 branches in South Africa, compared with 368 in 1939.

★

Lord Bridgeman, chairman of Atlas Copco (Great Britain) Ltd., left London on February 1 for a three-month visit to Australia, New Zealand and Canada. Lord Bridgeman is also on the boards of Canadian Copco and the Australian and New Zealand Atlas companies. During his visit to Australia he will visit the main mining areas of Queensland, Western Australia and Tasmania. Lord Bridgeman returned in November from an extensive tour of the Rhodesias and South Africa.

★

Mr. K. F. Dormer, technical director of Mackay Industrial Equipment Ltd., has begun an extensive tour of the U.S. and Canada. In addition to the International Road Federation Road Show at Chicago, where Allis-Chalmers will display many items of construction machinery, he will visit General Motors Electromotive Division at La Grange, Illinois, where the development of the free-piston principle is applied to locomotive power, and also the technical and development centre at Detroit, where emphasis is given to general research on Hyprex gasifiers and motive power for road vehicles.

★

Mr. A. R. Neelands, chairman of the Cementation Co. Ltd., is en route to South Africa for his annual visit. He was expected to arrive on February 7. Cementation has seven subsidiary companies operating in South Africa and Rhodesia. During his stay in Africa Mr. Neelands will visit many of the mine

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areas where cementation has proved successful. His itinerary will also include visits to Cementation subcontracts on important public works contracts, among them being Kariba and Swallow dams. He is scheduled to arrive back in Britain about the end of March.

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Mr. Gordon Jackson, director and general manager of Chaseside Engineering Co., Ltd., left for the U.S. by air on January 26 to attend the American Road Builders' Association Equipment Road Show at Chicago. With him went Mr. G. Leskine, development manager. As a result of his last trip, Mr. Jackson obtained for his company licence to manufacture the Hopco trencher (backhoe and swing shovel) for sale in the U.K. and Europe. On the same visit he negotiated for a supply of torque converters for incorporation in Chaseside loading shovels. He will also be visiting his company's Canadian subsidiary, the Chaseside Equipment Co., of Canada Ltd., at Toronto. This company will shortly be receiving their first deliveries of the Chaseside ore mover, a new dumper specially designed for underground trackless mining operations in the uranium mines.

★

A general meeting of the North Staffordshire Institute of Mining Engineers will be held in Stoke-on-Trent, on February 11, at 5.30 p.m.

★

The report of the British Delegation which recently visited the U.S.S.R. entitled "Engineering Education in the U.S.S.R.", will be presented for discussion at the Institution of Civil Engineers, Great George Street, London, S.W.1, at 5.30 p.m. on February 25.

PUBLICATIONS RECEIVED

The sixty-second edition of *Kempe's Engineer's Year Book*, for 1957, is edited as were its predecessors by C. E. Prockter, M.I.E.E., M.I.Mech.E., under the direction of B. W. Pendred, M.I.Mech.E., M.I.S.J., and is published by Morgan Brothers (Publishers) Ltd. Once again published in two volumes and well illustrated, the collective work, in case, costs 82s. 6d., plus postage. The section devoted to mining appears in the second volume. A good deal of revision has been done this year, sections and chapters having been brought up-to-date or generally revised in light of those developments recorded since the last edition was published. Specifically, the section dealing with non-ferrous metals and alloys has numerous revised tables, while new text has been included on magnesium alloys and the commercial titanium alloys. As might be expected, the remarks dealing with atomic power have received detailed revision. As a result of these amendments, this edition of *Kempe's* is as up-to-date as is possible. Sections of particular interest in Volume 1 include those discussing non-ferrous metals and alloys, powder metallurgy, ropeways and cableways, mechanical handling, hydraulic transmission of power, liquid pumps, lubrication, belts and the like. Volume 2 discusses mining, safety and other subjects of possible application to the mining industry. The whole is a valuable work that enhances the considerable reputation established by its predecessors.

★

Five papers read at a conference organized by the Incorporated Sales

Managers' Association and the British Institute of Management, and held at the Royal Festival Hall, London, October, 1956, have been published as a 48 pp. booklet, Entitled *Can We Sell Our Way Out of Inflation?* this booklet is obtainable from Management Publications Ltd., 8 Hill Street, London, W.1, price 3s. 6d.

★

Then and Now, the first of a series of brochures, describes the tremendous industrial developments in the "Three Rivers Country", as the North East Coast of England has come to be known. It is published by the North East Industrial and Development Association.

★

The work of the Imperial College of Science and Technology (University of London) is reviewed in the 49th annual report of the Governing Body, covering the financial year 1955-56.

★

Methods used in the world-wide search for new resources of oil are described in a splendidly illustrated booklet entitled *The Search for Oil*, which has been issued by the British Petroleum Co. Ltd., Britannic House, Finsbury Circus, E.C.2.

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Facts Concerning Uranium Exploration and Production, a handbook issued by the Bureau of Mines, U.S. Department of the Interior, sets out to answer, in a general way, the large number of questions submitted by the public regarding uranium prospecting, mining, milling and refining. A list of selected references follows each chapter. The hand-book is published by the U.S. Government Printing Office, Washington.

★

Australian Progress in the field of uranium and in atomic research is reviewed in the annual report of the Australian Atomic Energy Commission for 1955-56.

L.M.E. 75th ANNIVERSARY DINNER

The members of the London Metal Exchange held a dinner on the occasion of the 75th anniversary of the opening of the Exchange at the Savoy Hotel last Tuesday evening. Mr. Philip G. Smith, Chairman of the Committee of the Exchange, presided. The principal guests were the Chancellor of the Exchequer, Mr. Peter Thorneycroft, who proposed the toast of "The London Metal Exchange" and Sir Oliver Franks, Chairman of Lloyds Bank, who responded to the toast of "Our Guests".

Other notable guests, among whom were represented all those City institutions whose co-operation is so essential to the successful running of any commodity futures' market included Sir Harold Webbe, C.B.E., Member of Parliament for the Cities of London and Westminster; the Rt. Hon. Lord Aldenham, Chairman, Westminster Bank Ltd.; Monsieur G. Péter, Chairman of the International Tin Council; Sir Roger Makins, G.C.M.G., K.C.B., the Treasury; Sir John Braithwaite, Chairman of the Stock Exchange; Sir Frederick Leith-Ross, G.C.M.G., K.C.B., Deputy Chairman, National Provincial Bank Ltd.; Mr. J. A. R. Pimlott, C.B., and Mr. A. C. Hill, Board of Trade.

Others present included Mr. J. D. Wolff, Chairman, Metal Market and Exchange Co., Ltd.; Sir George Bolton, K.C.M.G., Executive Director, Bank of

CONTRACTS AND TENDERS India

The International Co-operation Administration (I.C.A.) has announced the following procurement for India: One closed circuit pilot plant grinding system with pneumatic classification (alternatively with centrifugal air separators), to be supplied with a tube mill lined with pure white chemically resistant porox or equivalent material, and grinding media of steel and ceramic in assorted sizes. Capacity: Approx. 200-300 lb. per hour, to grind product down to 300 mesh. Project Implementation Order No. 86-27-026-9-41166. Issuing authority, Government of India, India Supply Mission, 2536 Massachusetts Avenue N.W., Washington 8, D.C., U.S.A. Closing date 11/3/1957. B.O.T. Ref.: E.S.B./3265/57/I.C.A. Telephone enquiries to Chancery 4411, extension 360.

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INCO has signed a \$65,000,000 (£24,253,700) contract with Foundation Co. of Canada for construction at its Moak Lake property in Northern Manitoba. The main work to be done under the contract will be the construction of two mine surface plants, one mill smelter, and service buildings.

SUPPLIERS WANTED

Mr. C. McLeod, of the New York and Honduras Rosario Mining Co., Ltd., 120 Broadway, New York, who will be in Britain until March 23, is seeking sources of supply for steel balls (for use in ball mills), nails, wire rope, plastics and metal piping, sacks, manilla rope, medical supplies; picks, shovels, hammers and other mining small tools; steel drills, hollow ground; copper sulphate, sodium metasilicate, crude lime and filter cloth. Suppliers interested should write to Mr. McLeod, c/o 1 Landel Place, Glasgow, S.W.1. B.O.T. Ref.: E.S.B./1542/57. Telephone enquiries to Chancery 4411, extension 693.

England; Mr. F. F. Wolff, Rudolph Wolff and Co.; Mr. W. K. Davey, C.B.E., vice-chairman, Metal Market and Exchange Co., Ltd.; Mr. Ralph Tadman, Chairman of the Baltic Mercantile and Shipping Exchange; Sir Graham Hayman, President of the Federation of British Industries; The Rt. Hon. Lord Bicester, Chairman, Morgan, Grenfell and Co., Ltd.; Sir Francis Glyn, K.C.M.G., Chairman, Glyn Mills and Co.; Sir Edward J. Reid, Bart., O.B.E., Director of Baring Bros. and Co., Ltd.; Mr. R. Olaf Hambro, Chairman, Hambros Bank Ltd.; Sir Leslie Rowan, K.C.B., C.V.O., the Treasury; Mr. Edmund de Rothschild, T.D., N. M. Rothschild and Sons; Mr. W. G. Buchanan, Chairman, William Jachs and Co., Ltd.; Mr. L. P. Thompson-McCausland, Bank of England; Sir Cecil Ellerton, Deputy Chairman, Barclays Bank Ltd.; Mr. H. W. B. Schroder, Director of J. Henry Schroder and Co.; Sir Robert Shone, C.B.E., Executive Member of the Iron and Steel Board; Mr. W. Donald, C.B.E., Deputy Chairman, Midland Bank Ltd.; Mr. A. Pollen, Chairman, British Insurance Association; Mr. P. W. Milligan, Deputy Chairman of Lloyd's; Mr. V. A. Grantham, Chairman of the Chartered Bank; Mr. L. Guy, Director, C. Tennant Sons and Co., Ltd.; Mr. A. M. Baer, vice-chairman, Consolidated Zinc Corporation Ltd.; Mr. A. de V. Leigh, M.B.E., Secretary of the London Chamber of Commerce Inc.

Metals and Minerals

U.S. Aluminium Output Curtailed

We have had occasion before to observe that, as a very large user of electrical power, the aluminium industry can be severely hit by the effects of unfavourable weather conditions. Cutbacks in Canadian production in the early months of 1956, due to water shortage in Quebec, led to substantial reductions in deliveries to customers, which have not been wholly offset by higher shipments during the second half of the year. Now comes the news that leading U.S. aluminium companies have reduced aluminium production in the Pacific Northwest by about 25 per cent, as a result of power cutbacks by the Bonneville Power Administration. Extremely cold weather has raised power demand on the Federal system to record levels, so Bonneville has cut off all interruptible power to 13 industrial customers, among whom are Alcoa, Kaiser and Reynolds.

Interruptible power is sold on the condition that it can be cut off temporarily in periods of shortage. Kaiser is cutting back about 40 per cent of its primary aluminium production in Washington State. Reynolds estimates that output at the Troutdale, Ore., and Longview, Wash., mills will be reduced by about one-third. About one-third of Alcoa's Northwest primary aluminium output will also be curtailed. In all, roughly 11 per cent of the total U.S. supply of aluminium is being curtailed as a result of the power cutbacks. Though the supply position in the U.S. has become much easier, it is evident the immediate outlook for consumers must be adversely affected if the exceptionally cold weather in the Pacific Northwest is prolonged. Alcoa also expects some cutback in primary reduction as a result of continued low-water conditions in the Tennessee Valley area.

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The aluminium extrusion industry in the U.S., which only a few months ago was enjoying a booming market, is now in the throes of a price war. Over 40 new producers are reported to have entered the business last year and some are now selling below cost as the only alternative to quitting the business. Prices of aluminium bar extrusions have fallen by as much as 20 per cent, the average decline being in the region of 10 per cent. The Aluminium Extruders Council, which claims to represent 40 of some 105 independent extruders, has expressed the fear that new "normal" prices might wind up at unprofitable levels for small independent makers. Its members take about 60 per cent of the aluminium billets sold to the independents.

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The first ingot of aluminium ever produced in Africa has been turned out at the aluminium works at Edea in the French Cameroons. Edea is to produce 10,000 tons of aluminium this year and 45,000 tons when it reaches peak production in 1959. This undertaking forms part of a vast plan for using African bauxite and hydro-electric power to

raise France's aluminium output, which was 149,774 tons last year.

HOW HIGH BERYLLIUM?

A "potentially spectacular" future is seen for beryllium by a U.S. research team employed by the Rand Corporation. The team points out that beryllium is even lighter and in some ways stronger than titanium and shares titanium's resistance to heat. A plane made mostly of beryllium would weigh about half as much as to-day's basically aluminium plane. Such a craft, carrying the same amount of fuel and the same payload, would fly 40 per cent further without refuelling. Or, if the same distance were flown, one pound of payload could be added for every pound of beryllium used in the plane, since a pound of beryllium could replace two pounds of aluminium.

Economists on the team have calculated that the "worth in use" of such a substitution would, over the life of a plane, range up to \$1,000 a pound. This would be profitable, they contend, even though the initial cost of a beryllium airliner is likely to remain extremely high. It is calculated that, even after production of the metal has been fully developed, beryllium may cost up to \$200 per lb. installed in aircraft structures. This compares to about \$20 to \$40 for the "installed cost" of aluminium in planes to-day.

Sceptics have contended that the scarcity of beryl ore is an insurmountable obstacle to the development of the metal. The team point out, however, that excellent deposits exist in the U.S., especially in South Carolina, and also in foreign countries such as South America. In this connection it might be added that Southern Rhodesia, South West Africa and the Union of South Africa are important producers of beryllium ore.

It would be feasible to use beryllium in certain parts of a plane to-day, but they would have to be non-moving parts which could be cast. To produce sheets or extrusions, additional basic research is required to overcome the metal's lack of ductility. Rand Corporation is urging U.S. Government and industry to step up the attack on this problem. It predicts that another hurdle, toxicity of the metal's dust, can be overcome by modern industrial measures.

Beryllium-copper strip 100 per cent free from surface oxides, which markedly decrease die life, is now being produced at the Flushing, N.Y., plant of the American Silver Co. to meet the demands of fabricators or electronic, electrical, aircraft, instrumentation and other industrial equipment.

U.S. MINERAL BUYING

The House Appropriations Committee has voted to cut off the Government's subsidy programme for buying tungsten, asbestos, fluorspar and columbiatantalum. It rejected an administration

request for an additional \$30,000,000 to continue the buying programme for these four minerals until June 30. The administration is running out of money for these programmes. The so-called "stopgap programme" for the four minerals was scheduled to be continued up to December, 1958, with purchases to total \$91,000,000. The Administration is almost certain to appeal against the House Committee action to the Senate.

It seems improbable that suspension of the buying programme, which is confined to domestic ores, will have much impact on producers outside the U.S. For wolfram the implications are doubtless bearish, but the downward drift in wolfram prices can be attributed to a number of other factors besides uncertainty regarding future U.S. Government purchases of domestic ores. Among these may be mentioned the availability of high-grade Korean scheelite and the setback in car production, both of which have contributed to the recent tendency for supply to outrun demand.

CHEAPER COBALT

Early in December the price of cobalt stood at the record high level of 21s. a lb. During the past eight weeks it has fallen in two stages to 16s. a lb. Union Minière's price in the U.S. has been lowered to \$2 a lb. from \$2.35 and other producers have followed suit. Since the war production of this strategic metal has been rising steadily and there are indications that it has now outstripped consumption.

Cobalt is of almost critical importance to jet engine production and consumption in the aircraft industry must be trending steadily upwards. On the other hand, there has been some falling off on the magnet side, due to competition from alternative materials. A recent announcement suggests that any ground lost in this direction might to some extent be recovered following the development at Bell Telephone Laboratories of a new magnetic alloy containing cobalt and vanadium. It is claimed that this material will permit reductions in the size of magnetic components without any sacrifice in performance, and will facilitate the design of new components having greatly improved performance characteristics.

NEW USE FOR GOLD

The Bettinger Corporation, of Massachusetts, has developed a ceramic gold 22 carat finish for architectural use. It is claimed that the gold, fused into the surface of the ceramic, is permanent. The company believes that, by the very thin application in its fusing method, gold finishes can be produced that are competitive in price with other finishes, thus opening the way for their widespread use in curtain wall construction.

COPPER • TIN • LEAD • ZINC

HOW LOW WILL COPPER GO?

A fortnight ago in this column it was said that copper marketing was about to move into a more active phase after some months of stagnation; last week the action came. With effect from February 1 the R.S.T. Group cut its price for electrolytic wire bars from £270 to £250 per ton. The price has been at £270 since mid-December and, for a time, the new quotation was below the L.M.E. for cash metal. Across the Atlantic, Phelps Dodge reduced its price to 34 c. per lb., and this lead was soon followed by the other producers, while by mid-week Customs Smelters were quoting 33 c. with consumers showing little interest. Dealers are said to be quoting around 32½ c., but, of course, the amount of metal they have available is relatively small.

In the circumstances the lead has been taken by No. 2 scrap copper, which is now around 25½ c. per lb., which will give a price for refined copper in three months, of 31½ c. This is exactly the price of R.S.T. metal in terms of the dollar. Both the continuing fall of No. 2 scrap copper, and strong conviction among fabricators and consumers, point the fact that the price fall is not yet over. But, although most Americans have apparently convinced themselves that a further cut will be made in the producers' price, none is prepared to say at what level a halt will be called.

One can say fairly confidently that a halt will certainly be called at the level of 30 c.; the question really is whether a determined stand will be made to hold the price of the metal somewhere above that level. There have been no reports of any plans for further cutting back of output, but it would be surprising if the price were to go below 32 c. without some fairly sweeping overhaul of immediate production plans in the United States. There would be much in favour of the American producers declaring their hands at this stage, since the present uncertainty cannot cause that resurgence of buying which the producers are obviously looking for.

Two points are worth bearing in mind. The first is that with a good deal of American production being concentrated on vast opencast sites, output can be cut and restored with great rapidity. It ought to be possible, if the Americans can gauge the market accurately, to lift some of the surplus stocks from the market by cutting output without endangering supplies a few months ahead. The second point is that price cuts of the last six months have coincided with a rapid worsening of the Chilean economic situation. Very considerable pressure is no doubt being exerted by the Chileans to get the American producers to prop the price. At the same time the Chileans can hardly afford to allow output from their own mines to be curtailed. Whether the American companies can come to some arrangement among themselves without contravening the anti-trust legislation, is a very delicate point.

*

From the Copperbelt it is reported that the Supreme Council of the African Mineworkers' Union is showing great reluctance to allow its dispute with the

companies on increased wages to develop into a strike. It is said that branch meetings have voted overwhelmingly in favour of strike action. But the Union leaders must realize that the Union might not survive another strike and, if they are at all informed on the world copper supply-demand position, must also realize that this is no time for direct action.

STRIKES HELP TIN PRICE

Tin has shown some decline in the past week in the United States but the current quotation for spot Straits metal is still comfortably above \$1.00 at 102.50 c. per lb. One of the reasons for this is the failure to settle the strike at the Butterworth smelter. It is reported that the Penang branch of the Malayan Trade Union Congress has offered to mediate in the strike which has now been going on for more than four weeks. No success has yet been announced.

The latest report of A. Strauss and Co. points out that buyers in America held off from the market during December in the hope that prices would become lower after the Texas smelter was closed. In effect, for one reason or another, but mostly owing to strikes, the price has held up remarkably well, and it may be that the American producers are not so well covered as they would normally be. A. Strauss and Co. reports a January rush to cover for March, but also suggests that further buying is imminent to cover requirements for April and beyond.

LEAD STEADY

Lead weakened in London as it was bound to do in the circumstances of copper's fall. In the U.S. however, lead buying remained quite steady, and there was certainly no threat of a cut from 16 c. per lb. in New York. Stockpiling continues to provide a very genuine floor and the programme for acquiring foreign metal by barter is being expanded. On the other hand it is said that the acquisitions of domestic demands of metal for the stockpile have been smaller in the last month. The reason suggested in the trade is that the government buyers are anxious to stretch out the programme as long as possible. Since there is no danger to the price level at present, there is every justification for stockpilers to hold their hands, since it is believed that the whole question of assistance to the lead-zinc mining industry is under consideration in Washington.

DETROIT CLOUDS ZINC HORIZON

London zinc came under the influence of the movement in copper prices but stockpiling continues to be the principal factor in the price ruling across the Atlantic. The quotation remains unchanged at 13.50 c. per lb., East St. Louis for prime western grade. The further acquisition of foreign metal by barter, forecast by President Eisenhower in his opening addresses to Congress, is now

being planned. So long as stocks which threaten the market are removed in this way, there seems no likelihood of any shift in the price unless it be upward. Perhaps the only cloud on the horizon is the warning issued by Mr. Herbert Hoover, Jr., that the present inflation in the U.S. could bring the economy into depression. This had its effect upon Wall Street but the fact is that the present inflation is much milder than that experienced by Britain in the last eighteen months. It should also be remembered that the present Administration has by general assent kept the American economy on an even keel, with a remarkable certainty of touch. However, one of the trades which the Administration's policy has not particularly helped, is the motor industry and any thought of a depression there must cause the zinc producers some concern.

The London Metal Market (From Our L.M.E. Correspondent)

The past week has witnessed a decline in metal prices generally on the London Metal Exchange. On February 1 a reduction in the R.S.T. price of £20 to £250 was announced, and on the same day the U.S. producers' price was lowered 2 c. to 34 c. This adjustment served to bring these quotations more in line with the prices at present ruling in the open market and as such were not unexpected. It had, however, been suggested in many quarters that the American price might go to 33 c., and it remains to be seen whether it is their intention to hold the price at the new level. This naturally depends to a great extent on a revival of buying interest, but there are no indications yet that consumers are prepared to re-enter the market.

There has been a certain amount of inquiry from the Continent but the volume of business actually transacted has been small. In the absence of any support all the factors point to a further lowering in the price, and if indeed the U.S. producers follow it is anticipated that their announcement will be accompanied by some action designed to bring about a reduction in their output.

The Texas tin smelter in the States has now ceased operations, and the market has declined in anticipation of improved supplies in due course as a result of the diversion of concentrates to other smelters. Although stocks in L.M.E. warehouses fell 33 tons last week and now stand at 505 tons, the backwardation has narrowed somewhat under the influence of a certain amount of selling of cash metal. Consumer demand is reported as satisfactory. The strike at the Penang smelter of the Straits Trading Co. still continues. On Thursday morning the Eastern price was equivalent to £779 per ton c.i.f. Europe.

Lead and zinc have followed the general trend, which, apart from other considerations, reflects the likelihood that the U.S. government will not be prepared to proceed with the barter programme at the price levels which have been ruling recently. At the same time the U.S. stockpile did not take up by any means all the zinc offered by producers in January. A welcome feature in this market has been the narrowing in the backwardation, and it is to be hoped that there will be no reversal of this trend.

Closing prices and turnovers are given in the table overleaf.

LONDON METAL AND ORE PRICES, FEBRUARY 7, 1957

THE WEEK ON THE L.M.E.

	January 31		February 7	
	Buyers	Sellers	Buyers	Sellers
COPPER				
Cash	£252	£252½	£248½	£249
Three Settlement	£251	£251½	£247½	£248
Week's turnover	£252½		£249	
	7,200 tons		7,875 tons	
LEAD				
Current ½ month	£115	£115½	£113½	£113½
Three months	£113½	£114	£112½	£113
Week's turnover	2,650 tons		2,725 tons	
TIN				
Cash	£796	£797	£779	£780
Three months	£771	£772	£762	£763
Settlement	£797		£780	
Week's turnover	715 tons		755 tons	
ZINC				
Current ½ month	£103½	£103½	£101½	£102
Three months	£100½	£100½	£98½	£99
Week's turnover	5,100 tons		2,950 tons	

METAL PRICES

Aluminium, 99.5% £197 per ton

Antimony—

English (99%) delivered, 10 cwt. and over £210 per ton
Crude (70%) £200 per ton
Ore (60%) bases 23s. 6d./24s. 6d. nom. per unit.

a.i.f.

Arsenic, \$400 per ton

Bismuth (min. 1 ton
Cadmium 12c. 9d. 9b

Cesium 12a. 0d. 16.

Chromium (99% mett.), £13 18s. 1b.

Chromium, A.
Cobalt. 19a. Ib.

ORES AND OXIDES

Bismuth	..	..	..	..	..	..	..	..	..	65% 8s. 6d. lb. c.i.f. 20% 3s. 3d. lb. c.i.f.
Chrome Ore—										
Rhodesian Metallurgical (semifriable)	48%	..	..	..	..	..	..	..	..	£17 8s. 0d. per ton c.i.f.
" Hard Lumpy (45%)	..	..	..	..	..	..	..	..	..	£17 8s. 0d. per ton c.i.f.
" Refractory 40%	..	..	..	..	..	..	..	..	..	£12 15s. 0d. per ton c.i.f.
" Smalls 42%	..	..	..	..	..	..	..	..	..	£16 5s. 0d. per ton c.i.f.
Baluchistan	..	..	..	..	..	..	..	..	..	£18 15s. 0d. per ton c.i.f. 185s./197s. 6d. per unit
Columbite, 65% combined oxides, high grade	..	..	..	..	..	..	..	..	..
Fluorspar—										
Acid Grade, Flotated Material	..	..	..	..	..	..	..	..	..	£22 per ton ex. works
Metallurgical (75/80% Ca F ₂)	..	..	..	..	..	..	..	..	..	15s. 6d. ex. works
Lithium Ore —										
Petalite min. 34% Li ₂ O	..	..	..	..	..	..	..	..	..	£8-£10 per ton f.o.b. Beira
Lepidolite min. 34% Li ₂ O	..	..	..	..	..	..	..	..	..	£8-£10 per ton f.o.b. Beira
Amblygonite basis 7% Li ₂ O	..	..	..	..	..	..	..	..	..	£28-£32 per ton f.o.b. Beira
Magnesite, ground calcined	..	..	..	..	..	..	..	..	..	£28 Os./£30 Os. d/d
Magnesite Raw (ground)	..	..	..	..	..	..	..	..	..	£21 Os./£22 Os. d/d
Molybdenite (85% basis)	..	..	..	..	..	..	..	..	..	8s. 5d. nom. per lb. (f.o.b.)
Titanium Ore —										
Rutile 95/97% TiO ₂	..	..	..	..	..	..	..	..	..	£75/£77 per ton c.i.f. Aust'n
Ilmenite 52/54% TiO ₂	..	..	..	..	..	..	..	..	..	£11 per ton c.i.f. Malayan
Wolfram and Scheelite (65%)	..	..	..	..	..	..	..	..	..	200s./205s. per unit c.i.f.
Manganese Ore Indian										
Europe (46%-48%) basis 155s. freight plus 17½% surcharge	..	..	..	..	..	..	..	..	..	141d.-151d. nom. per unit c.i.f.
Manganese Ore (43%-45%)	..	..	..	..	..	..	..	..	..	116d. nom. per unit c.i.f.
Manganese Ore (38%-40%)	..	..	..	..	..	..	..	..	..	111d. nom. per unit (including duty)
Vanadium —										
Fused oxide 90-95½% V ₂ O ₅	..	..	..	..	..	..	..	..	..	£124-£134 per unit c.i.f.
Zircon Sand (Australian) (65-66% ZrO ₂)	..	..	..	..	..	..	..	..	..	£20 per ton c.i.f.

LONDON STOCK EXCHANGE PRICES, FEBRUARY 6, 1957

Finance	Price Feb. 6	+ or - Feb. 6 on week	Rand Gold contd.	Price Feb. 6	+ or - Feb. 6 on week	Diamonds and Platinum	Price Feb. 6	+ or - Feb. 6 on week	Tin (Nigerian and Miscellaneous) contd.	Price Feb. 6	+ or - Feb. 6 on week
African & European ..	57/6	-7/-	W. Rand Consolidated ..	31/3	-7/-	Anglo American Inv. ..	9 1/2	-5/-	Gold & Base Metal ..	1/14	-1 1/2
Anglo American Corpn. ..	71/9	-3d	Western Reefs ..	30/1 1/2	-4 1/2d	Casts ..	26 1/2	-3/-	Jantan Nigeria ..	3/-	-14/-
Anglo-French ..	22/9	-	O.F.S. Gold ..	6/3	-1 1/2d	Co-rs. Diam. of S.W.A. ..	10/7 1/2	-1d	Jos Tin Area ..	14/-	-
Anglo-Transvaal Consol. ..	27/6	-	Freddies ..	3/3	-	De Beers Defd. Regd. ..	5 1/2	-	Kaduna Prospectors ..	1/9	+3d
Central Mining (£1 shrs.) ..	52/6	-3/3	Freddies Consolidated ..	71/10 1/2	-	Pots Platinum ..	14/-	-	Kaduna Syndicate ..	2/3	-1 1/2d
Consolidated G'fields ..	57/9	-2/9	Geoffries ..	3/-	-	Waterval ..	15/9	-6d	London Tin ..	11/-	+1 1/2d
Consol. Mine Selection ..	34/4 1/2	-	Harmony ..	25/3	+3d	Copper ..	44/6	-2 1/2	United Tin ..	9d	-
Eas. Rand Consols ..	1/6	-	Lorraine ..	4/9	-3d	Bancroft ..	69/9	-3d	Silver, Lead, Zinc ..	70/9	+9d
General Mining ..	70/-	-	Merriespruit ..	3/9	-	Chartered ..	2/9	-3d	Broken Hill South ..	3/9	-
H. E. Prop. ..	8/-	-	Middle Wits ..	8/-	-	Esperanza ..	8/1	-3d	Burma Mines ..	84/-	+2/6
Rand Mines ..	65/-	-9d	Ofsits ..	51/3	-	Messina ..	11 1/2	-2	Consel. Zinc ..	10/1 1/2	-3d
Rand Selection ..	36/3	-	President Brand ..	51/10 1/2	-7 1/2d	Nchanga ..	4 1/2	-	Lake George ..	29/9	+9d
Union Corporation ..	38/6	-9d	President Steyn ..	30/6	-3d	Rhod. Anglo-American ..	44/9	-2 1/2	Mount Isa ..	56/-	+2/-
Vereeniging Estates ..	5/-	-3d	St. Helena ..	27/10 1/2	-1 1/2d	Rhod. Katanga ..	2/9	-	New Broken Hill ..	6x	-
Wrists ..	36/3	-	Virginia Ord. ..	8/9	-3d	Rhodesian Selection ..	44/-	-3/-	North Broken Hill ..	13/6	+3d
West Wits ..	33/6	-3d	Welkom ..	15/9	-3d	Rokhana ..	37 1/2	-3	Rhodesian Broken Hill ..	26/-	+1 1/2
Rand Gold ..			Western Holdings ..	71/10 1/2	-7 1/2d	Rio Tinto ..	4 1/2	-	San Francisco Mines ..	4/-	-4 1/2d
Blyvoors ..	20/3	+1 1/2d	West African Gold ..	1/3	-	Roan Antelope ..	24 7/8	-10 1/2d	Uruwira ..		
Brakpan ..	5/7 1/2	-	Amalgamated Banket ..	3/4 1/2	-	Selection Trust ..	5	-	Miscellaneous ..		
Buffelsfontein ..	33/1 1/2	-1 1/2	Ariston ..	16 1/2	-	Tanks ..	7 1/2	-	Base Metals and Coal ..		
City Deep ..	11/-	-3d	Ashanti ..	16 1/2	-	Tharsis Sulphur Br. ..	5	-	Amal. Collieries of S.A. ..	2 1/2	+1 1/2
Consol. Main Reef ..	12/-	-6d	Bibiani ..	2/-	-	Tin (Eastern) ..			Associated Manganese ..	40/-	-9d
Crown ..	27/6	-	Bremang ..	1/4	-	Ayer Hitam ..	24/9	-	Cape Asbestos ..	10 1/2	+1 1/2d
Daggas ..	34/4 1/2	-7 1/2d	G.C. Main Reef ..	1/4	-	Gopeng ..	14/9	-1 1/2d	C.P. Manganese ..	24/-	-
Dominion Reefs ..	18/-	-	Konongo ..	1/4	-	Hongkong ..	8/1	-6d	Consol. Murchison ..	46/3	-2 1/2
Doornfontein ..	23/-	-1/6	Marlu ..	1/-	-	Ipoh ..	26/-	-	Natal Navigation ..	3 1/2	-
Durban Deep ..	24/4	-	Taquah ..	1/-	-	Kamunting ..	10/6	-	Turner & Newall ..	112/6	-2 1/2
E. Champs. ..	3/-	-	Western Selection ..	6/4 1/2	-	Kepong Dredging ..	5/6	-	Wankie ..	17/3	-1 1/2
E. Geduld (4s. units) ..	26/9	-9d	Australian Gold ..	13/9	-	Kinto Tin Mines ..	23/3	-	Witbank Colliery ..	5 1/2	-
E. Rand Props. ..	43/9	-7 1/2d	Gold Mines of Kalgoorlie ..	12/6	-	Malayan Dredging ..	15 1/2	+3d	Canadian Mines ..		
Geduld ..	73/9	-1 1/2	Great Boulder Prop. ..	18/4 1/2	-	Pahang ..	12/4 1/2	-4 1/2d	Dome ..	\$26	-
Govt. Arms ..	2/10 1/2	-1d	Lake View & Star ..	16/6	-	Pongkalen ..	17/3	-	Hollinger ..	\$50	-1 1/2
Grootvlei ..	16/7 1/2	+3d	Mount Morgan ..	7/7 1/2	-	Petaling ..	7/7 1/2	-1 1/2d	Hudson Bay Mining ..	\$165	+2
Hartebeestfontein ..	45/7 1/2	-1 1/2	North Kalgurli ..	7/7 1/2	-	Rambutan ..	26/-	-	International Nickel ..	\$197	-
Libanon ..	6/7 1/2	-	Sons of Gwalia ..	1/9	-	Siamese Tin ..	11/10 1/2	-7 1/2d	Mining Corp. of Canada ..	7 1/2	-
Luipaards Vlei ..	13/6	-4 1/2d	Western Mining ..	11/1	-	S. Malaya ..	16/4 1/2	-9d	Noranda ..	\$100	-
Marievale ..	16/10 1/2	-3d	Miscellaneous Gold ..	8/-	-	S. Tronoh ..	10/1 1/2	-	Quemont ..	26/-	-
New Kleinfontein ..	3/-	-	Cam & Motor ..	13/1	-	Sungki Kinta ..	19/6	-3d	Yukon ..	4/4 1/2	-1 1/2
New Pioneer ..	17/-	-	Champion Reef ..	1/2	-	Tekka Taiping ..	8/1 1/2	-	Oil ..		
Randfontein ..	30/6	-1/6	Falcon Mines ..	7/9	-	Tronoh ..	12/9	-1 1/2d	Apax ..	41/9	+3d
Robinson Deep ..	6/9	-3d	Globe & Phoenix ..	23/3	-	Tin (Nigerian and Miscellaneous) ..			Attock ..	37/6	+3d
Rose Deep ..	7/9	-3d	Motapa ..	1/6	-	Amalgamated Tin ..	10/9	-1 1/2d	British Petroleum ..	131/10 1/2	+1 1/2
Skinner & Jack ..	3/7 1/2	-3d	Mysore ..	3/3	-	Burmah ..	84 1/2	-7 1/2d	Burmah ..	62/3	-2 1/2
S.A. Lands ..	22/6	-	Nundydroog ..	18/-	-	Bisiehi ..	4/4	-	Canadian Eagle ..	21/10 1/2	-
Springs ..	2/3	-	St. John d'El Rey ..	63/9	-	British Tin Inv. ..	23/9	-	Mexican Eagle ..	155/-	-1 1/2
Stilfontein ..	27/9	-	Zama ..	50/-	-	Ex-Lands Nigeria ..	2/3	-	Shell ..	47/6	+6
Sub Nigel ..	17/-	-		50/-	-	Glensoft Tin ..	20/6	-	T.P.D. ..	62/3	+3d
Vaal Reefs ..	32/1 1/2	-1 1/2			-			-	Ultramar ..		
Van Dyk ..	2/3	-			-						
Venterspost ..	12/1 1/2	-4 1/2d			-						
Vlakfontein ..	15/-	-6d			-						
Vogelstruisbuist ..	12/1 1/2	-6d			-						
West Driefontein ..	5/-	-			-						

Mining Finance

Blyvoors are Cheap

Ore reserve figures published by Blyvoortuizicht Gold Mine show that this property has the richest uranium deposits on the West Wits Line. Moreover, uranium development results during 1956 followed an upward trend, improving from 27.9 in.-lb. in the March quarter to 31.0 in.-lb. during the last three months of the year.

Rising uranium values at Blyvoor may obviously be taken as a "bull point", and if the current trend continues it could eventually result in higher profits being earned during the period of contract with the A.E.C. Yet, as for all South African producers, the absence of cost and price figures for uranium makes the question of "how much more profit" almost impossible to answer. As time goes by, and further thought and analysis can be given to the probable value of detailed comparisons between individual uranium producers, it may be possible to arrive at some method of estimating the additional financial benefits which might arise from upward adjustments to mill grades. But for the moment the problem has not much chance of solution.

In the longer term, as contract termination dates draw nearer, the Government's reluctance to disclose this essential information will probably wane. Meanwhile, it may be useful to bear in mind the widely accepted theory that uranium costs on S.A. gold mines are not only uniform but very low. The latter contention is strengthened by the small numbers of labour employed at treatment plants.

Current working profits from uranium at Blyvoor amount to as much as 18 per cent of those from the mine as a whole. But this should not be allowed to overshadow the excellent progress which has recently been achieved in gold development.

Early last year we suggested that improving gold development results at Blyvoor were well worth watching for the ultimate effect they were likely to have on mill grade. Initial opening-up operations took place under difficult post-war conditions which necessitated preliminary development of the rich No. 1 Shaft area. A good deal of work has since been done in the lower grade western sections with the result that yield per ton milled has fallen sharply from over 16 dwt. a ton to under 11½ dwt. While no signs of recovery are yet apparent, average values of payable ore developed have improved from 536 in. dwt. in 1953-54 to 712 in. dwt. in 1954-55, and to 764 in. dwt. in 1955-56. During the September quarter of 1956-57 they jumped to 947 in. dwt. and moved up still further to 1,020 in. dwt. during the three months ended December 31, 1956—or nearly double the 1953-54 figure.

During 1955-56, Blyvoor's dividends were reduced to 2s. per 2s. 6d. share from the previous year's level of 2s. 3d. Profits earned during the first six months of 1956-57 have been fully maintained, however, and thus no further cuts need be anticipated. Indeed, if present develop-

ment results are maintained there should be very definite scope for a rise.

At their present level of around 20s. Blyvoor's 2s. 6d. shares offer the very good return of 9½ per cent. Their fall during 1956 from a high point of 25s. 4½d. to 19s. 10½d. was probably due entirely to the depressed nature of the gold share market as a whole. In view of the mine's prospects the present price seems to offer an attractive purchase.

NO FIGURES FOR TSUMEB

The Anglo American Corporation of South Africa, British South Africa Company and New Consolidated Goldfields, intend to make an offer for the shares of the South West Africa Company. The terms involved are £5 per S.W.A. Co. share for two out of every three shares at present held by each shareholder.

As stated in the *Mining Journal* last week, a bid for S.W.A. Co. has already been made by the Tsumeb Corporation (a company in which U.S. interests have predominant holdings), under which one new 5s. Tsumeb share, plus 20s. in cash, was offered in exchange for every four S.W.A. Co. shares. This proposal has been criticized on the grounds that the S.W.A. Co.—the Commonwealth's only vanadium producer—would pass out of British hands. In reply, Tsumeb has pointed out that even if it does acquire a controlling interest in the S.W.A. Co., vanadium won in S.W. Africa would still be sold in the U.K. against sterling as hitherto.

Since the new bid, S.W.A. Co. shares have risen above the figure of £5 offered. The situation is, for the moment, somewhat confused. And whatever else—and this story is still very far from its end—before things go much further it is essential that Tsumeb should publish a detailed account of its financial position, production and ore reserve figures, together with an up-to-date statement of development exploration carried out at the property.

In our issue of the *Mining Journal* dated November 30, 1956, we took the view that at 85s. S.W.A. Co. 13s. 4d. shares had the prospect of rising to over £5. While this has now been justified, it is impossible to make any further assessment of the potential value of these shares until further statistical details are forthcoming from Tsumeb.

PROPOSED GOLD MERGER

Ever since the announcement on August 27, 1956, by the Consolidated Gold Fields of South Africa and The Central Mining and Investment Corporation that conversations had been started with a view to merging the two companies, considerable speculation had surrounded the question of when the operation might be effected. The future for such a joint enterprise with great financial strength and progressive management

seemed most promising, and the project had received widespread approval.

The news that the merger proposals cannot be recommended has caused disappointment, although some comfort may be drawn from the statement that the companies are determined to strengthen in every way possible their traditional co-operation in the field of overseas mining.

BUFFELS' MAIDEN PROFITS

Outstanding amongst January returns from South African gold-uranium mines was that from Buffelsfontein at which production officially began on January 1. Over the month the mine was able to achieve the extremely large initial throughput of 80,000 tons resulting in a recovery of 21,000 oz. of gold, equivalent to a yield of 5.2 dwt. per ton. Working costs ran as low as 50s. 6d. per ton milled, and profits came out at over £60,000. All being well, this promising property expects to be able to mill at capacity of 100,000 tons monthly without much delay, in addition to which uranium production is expected to start about June. This first month's operations at Buffels follows an impressive record of opening-up since the preliminary work started at the property in September, 1953. Our usual table of monthly results—based on a gold price of 249s. per oz. against 250s. in December—will be found on page 193 of this issue.

BANK RATE CUT TO 5 PER CENT

The reduction in the Bank Rate yesterday to 5 per cent brought a better tone to the market although its impact was relatively slight as prices had already largely discounted the decision. Prices ought now to go better in anticipation of the next reduction to 4½ per cent or possibly 4 per cent expected by many to be effected before the Budget. Economic uncertainties on both sides of the Atlantic caused *The Dow Jones Industrial Index* to fall from 479.16 to 470.81 between January 31 to February 6 and *The Financial Times Industrial Ordinary Index* from 187.4 to 183.1 over the same period.

Kaffirs have been firmish over the week and stiffened perceptibly in front of the Bank Rate announcement, only to go easier immediately afterwards. On balance, however, several issues have hardened slightly.

CHARTERED PAYS MORE

A feature of yesterday's news was the final payment of 25 per cent from "Chartered" making, with the interim of 10 per cent, 35 per cent for the year ended September 30, 1956, which compares with 30 per cent in 1955-56. Net profits advanced to £6,974,156 from £5,617,654 and the shares went ahead sharply.

LOWER COPPER PROFITS

Since June 30, 1956, when the R.S.T. Group companies began their present financial years, prices received from sales of copper have averaged little more than £275-£280 a ton compared with about £340 during the previous twelve months. It is not surprising, therefore, that profits during the first six months of 1956-57 should have shown a substantial fall from those made during the half-year ended December 31, 1955. In the case of Mufulira, operating profits have dropped to £5,124,000 from £7,782,000 during the previous corresponding period of 1955. At Roan Antelope profits over the same period have been reduced to £3,685,000 from £5,793,000.

In these circumstances, it is all the more encouraging that production costs (helped considerably by lower royalty payments) should have shown such steadiness. At Mufulira, an average level of £145 per ton of copper produced during the September and December quarters of 1956 compares with £154 over 1955-56 as a whole. For Roan Antelope, costs averaged about £160 a ton during the two quarters and compared with £167 over the preceding financial year.

	Sept.	Dec.
	qtr.	qtr.
	1956	1956
Output (t.tons)	21,688	27,997
Sales (t.tons)	22,249	21,488
	£000's	£000's
Revenue	6,360	5,900
Costs	3,069	4,067
Diff. in value of copper stocks	Dr.268	Cr.907
Surplus	3,023	2,740
Replacements*	184	225
Profit†	2,839	2,515
<i>Roan Antelope</i>		
Output (t.tons)	19,358	23,190
Sales (t.tons)	18,807	19,561
	£000's	£000's
Revenue	5,230	5,255
Costs	3,085	3,715
Diff. in value of copper stocks	Dr.58	Cr.583
Surplus	2,087	2,123
Replacements*	162	206
Profit†	1,925	1,917
<i>Chibuluma</i>		
Output (t.tons)	4,431	2,111
Sales (t.tons)	3,970	4,263
	£000's	£000's
Revenue	1,120	1,152
Costs	526	316
Diff. in value of copper stocks	Dr.8	Dr.243
Surplus	586	593
Replacements*	153	154
Profit†	433	439

* Subject to revision in full year's accounts.
† Before taxation.

Profits before taxation earned by Rhodesian Selection Trust (which holds 63.98 per cent of Mufulira and 64.29 of Chibuluma) declined during the December quarter of 1956 to £1,868,000 from £2,076,000 in the preceding three months. A total of £3,944,000 earned during the last six months of 1956 thus compares with £4,759,000 during the corresponding period of 1955.

Against a background of growing doubts as to whether boom conditions in the U.S. will continue during 1957, together with a general reduction of activity by U.K. metal users, it is all too easy to take a bearish view of copper shares. The above results, together with

R.S.T. Group's decision last week to cut their electrolytic price by £20 to £250, and the subsequent reduction by 2 c. to 34 c. per lb. by some U.S. producers, have all exerted a depressing influence. But, at the same time, copper shares have come back a long way from their high levels in 1956 and at their present prices discount to no small extent reductions in dividends which must assuredly take place this year. The yields offered by these shares are not unattractive—at their present price of 44s. 6d. compared with a high point of 58s. in 1956. R.S.T. 5s. shares return 8½ per cent while Roan Antelope 5s. shares, which have fallen to 24s. 6d. from 31s. 3d. last year, yield as much as 12½ per cent.

Speaking at an informal meeting in New York of shareholders of the Rhodesian Selection Trust group of companies, Sir Ronald L. Prain said that profits for the current year would not match the previous year's record because prices were going down without concurrent reductions in costs. While supplies of copper were adequate to meet demand, continued Sir Ronald, this equation might be upset by events such as strikes or changes in government stockpiling policies. R.S.T. group companies expected to dispose of all their production during 1956-57.

Financial News and Results

Rio Tinto May Bid For Kern Oil.—Negotiations have been taking place between The Rio Tinto Company and Kern Oil Company which, if certain preliminary conditions are fulfilled within a period estimated not to exceed two months, will result in an offer being made for the acquisition of the whole of Kern Oil's share capital.

Under Rio Tinto's proposals, provided the preliminary conditions are fulfilled, Kern Oil stockholders will be offered 36 Rio Tinto ordinary 10s. shares for every 100 stock units of 4s. in their company. An alternative option is open to Kern stockholders under which cash of 30s. per stock unit may be received. Kern Oil 4s. shares at present stand at around 28s. 9d.

Inco Again Pays 65 c.—A quarterly dividend of 65 c. (U.S. currency) has been declared by the International Nickel Company of Canada. During 1956 quarterly payments of 65 c. were followed by a year-end declaration of \$1.15 which made up a total of \$3.75 on the common stock.

Record Shaft Sinking at Saaiplaas.—During January, No. 1 shaft at Free State Saaiplaas Gold Mining Company was sunk a total of 684 ft. to a depth of 826 ft. This is a record for a circular concrete-lined shaft.

Union Minière's Second Interim.—Union Minière du Haut-Katanga recently decided to pay an interim dividend of Francs Congolais 700 per ordinary share—or Francs Congolais 70 per one-tenth part of an ordinary share free of Belgian or Congolais taxation. This dividend, together with that paid in November last year, is on account of total distribution for the financial year ended December 31, 1956, the amount of which will be decided at the meeting on May 23, 1957.

Apex Invests in Canada.—In his recent statement to shareholders of Apex (Trinidad) Oilfields, Mr. F. R. Cottell, the chair-

man, stated that the company had recently acquired a participation in Canpet Exploration—a Canadian affiliate of Ultramar Co. Canpet, he said, was concerned with the search for, and acquisition of, oil properties in Canada.

Tin Capital Returns.—Court sanction has now been received for returns of capital by Kent (F.M.S.) Tin Dredging to the extent of 1s. per 2s. shares; Tekka 2s. 6d. for each 15s. share, and Rambutan 7s. 6d. for each 12s. 6d. share. These returns will be effected at an early date.

The Filani Tin Offer.—Filani (Nigeria) Tin Mining has recommended its holders to accept an offer—which they themselves have agreed to accept—from Hart, Son and Co., to purchase the company's 2s. stock at 2s. 10½d. per unit.

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Rand and Orange Free State Returns For January

Company	January, 1957			Year ends	Current Financial Year			Last Financial Year		
	Tons (000)	Yield (oz.)	Profit† (£'000)		Tons (000)	Total to date	Profit† (£'000)	Tons (000)	Total to date	Profit† (£'000)
Goldfields										
Doornfontein a	80	32,400	164.5	J	528	209,926	986.9	360	144,837	580.1
Libanon	98	22,099	54.7	J	678	151,909	382.7	680	148,436	404.3
Luijpaards Vlei b	76	13,637	8.2	J	575	103,248	69.4	—	—	—
Rietfontein	26	5,700	15.7	D	26	5,700	15.7	26	5,956	18.6
Robinson	72	14,584	4.3	D	72	14,584	4.3	78	17,347	12.4
Simmer & Jack	95	17,402	16.8	D	95	17,402	16.8	100	17,877	13.1
Sub Nigel	66	17,820	34.0	J	464	132,456	356.8	466	146,375	546.6
Venterspost	124	29,462	63.0	J	867	196,098	468.1	848	200,378	524.9
Vlakfontein	48	17,095	82.9	D	48	17,095	82.9	39	14,400	70.2
Vogels	100	23,500	60.5	D	100	23,500	160.5	103	26,266	77.2
West Drie a	75	71,280	58.0	J	525	491,097	4042.7	497	390,926	3099.1
Anglo American										
Brakpan	108	18,469	13.0	D	108	18,469	13.0	109	18,585	16.6
Daggas a	215	47,945	259.7	D	215	47,945	259.7	200	45,801	259.4
East Daggas	94	15,440	31.6	D	94	15,440	31.6	94	15,558	35.5
F. S. Geduld c	48	25,123	121.4	S	187	89,964	407.8	33	10,801	20.2
Lorraine a	62	11,997	L6.2	S	242	46,295	L30.5	164	27,209	L114.4
President Brand a	60	46,200	38.6	S	241	185,109	1525.9	207	165,773	1373.1
President Steyn a	90	35,236	204.6	S	353	137,530	805.4	331	119,393	659.5
S.A. Lands	85	18,801	65.2	D	85	18,801	65.2	84	16,675	47.3
Springs	125	14,625	7.5	D	125	14,625	7.5	124	15,314	14.0
Vaal Reefs a d	55	23,432	133.6	D	55	23,432	133.6	—	—	—
Welkom	87	21,533	47.1	S	342	84,601	182.8	325	67,622	69.9
Western Holdings a	88	40,268	255.1	S	352	158,033	1011.1	295	112,542	667.1
West Reef Ex. a	120	25,817	59.4	D	120	25,817	59.4	112	22,388	48.6
Central Mining										
Blyvoor d	105	59,434	421.1	J	737	414,768	3028.2	730	414,121	3033.4
City Deep	158	30,868	18.6	D	158	30,868	18.6	153	29,271	3.1
Cons. M.R.	162	23,125	8.1	J	1,154	161,130	64.9	1,196	170,055	129.9
Crown	265	38,448	L8.4	D	265	38,448	L8.4	285	45,722	40.3
D. Roodepoort	188	32,884	56.6	D	188	32,884	56.6	181	30,032	53.5
East Rand Prop.	211	55,595	167.7	D	211	55,595	167.7	202	52,521	174.1
Harmony a	81	30,399	140.1	J	544	211,993	1116.6	500	188,304	953.1
Modder East	143	14,491	7.0	J	979	100,789	58.2	902	95,821	52.9
Rose Deep	49	7,623	0.2	D	49	7,623	0.2	46	7,511	3.5
J.C.I.*										
E. Champ d'Or a	12	350	L26.3	D	12	350	L26.3	17	1,050	L38.7
Freddies Cons. a	56	13,757	L28.5	D	56	13,757	L28.5	74	11,860	L50.0
Govt. G.M.A. a	152	24,140	L11.3	D	152	24,140	L11.3	230	29,417	5.1
Randfontein a	83	13,922	28.2	D	83	13,922	28.2	—	—	—
Union										
East Geduld	140	43,226	302.8	D	140	43,226	302.8	108	15,670	40.4
Geduld Prop.	107	16,943	26.8	D	107	16,943	26.8	104	16,535	38.1
Grootvlei	197	42,163	220.9	D	197	42,163	220.9	190	41,127	227.0
Marievale	72	18,896	84.4	D	72	18,896	84.4	70	18,305	84.3
St. Helena	120	34,791	190.4	D	120	34,791	190.4	98	28,525	151.2
Van Dyk	80	13,172	2.8	D	80	13,172	2.8	80	13,090	1.2
General Mining										
Buffelsfontein a f	80	21,000	60.3	J	80	21,000	60.3	—	—	—
Ellatton a	32	6,750	15.3	D	32	6,750	15.3	31	7,542	27.6
S. Roodepoort	30	7,011	25.6	J	204	47,583	174.5	194	43,794	156.4
Stilfontein a	91	38,669	241.5	D	91	38,669	241.5	83	32,626	194.3
W. Rand Cons. a	140	19,452	5.8	D	140	19,452	5.8	230	23,115	L85.1
Anglo-Transvaal										
Hartbeesfontein a	80	40,800	252.7	J	600	247,578	1491.7	351	150,297	719.6
N. Klerksdorp a	10	1,229	L5.2	D	10	1,229	L5.2	10	1,189	L5.0
Rand Leases	162	25,515	7.4	J	1,093	169,506	L181.0	1,239	197,994	181.9
Village M.R.	32	5,330	8.0	J	234	36,691	60.3	239	35,346	66.2
Virginia O.F.S. a	95	24,938	60.5	J	636	135,980	394.6	491	104,728	255.5
Others										
N. Kleinfontein f	100	11,312	L12.6	D	100	11,312	L12.6	105	12,251	3.5
Wit Nigel	18	4,004	6.9	J	126	27,931	55.8	128	26,865	56.2

Gold has been valued at 249s. (December 250s.) per fine ounce. Operations at Merriespruit remain suspended. L indicates loss. † Working Profit. * Working Profit includes Sundry Revenue. a Excluding revenue from Uranium, Acid and Pyrite. b Gold Division only. c Production began January 1956. d Production began May 1956. e Production began January 1957. f No. 5 shaft and South shaft to be closed down by the end of March 1957. The resulting substantial economies should eliminate the losses now being incurred.

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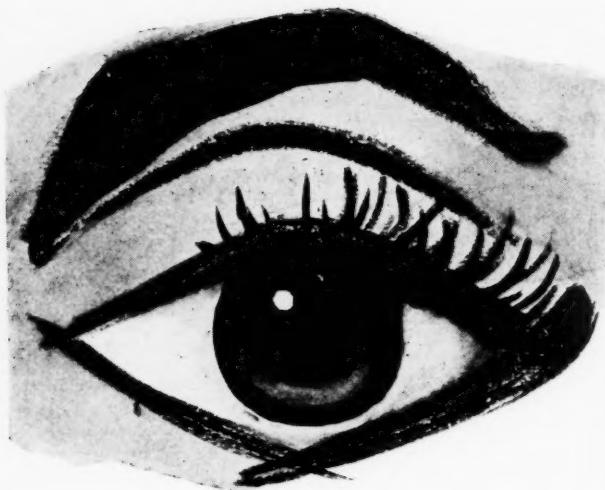
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